New COMPOSITE MATHEMATICS

Class

4

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Cover image represents Mathematics in real life

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Preface

In response to the tremendous response and numerous feedbacks received from teachers and students, we feel great pleasure to bring out this new edition titled **New Composite Mathematics** for LKG to Class 5.

As you are well aware, the primary classes form the foundation of a student's knowledge. It is at this very level that a child grasps the fundamental concepts of mathematics, which he/she goes on to apply to all sorts of fields in higher classes. It, therefore, becomes essential to make him/her understand these concepts very clearly.

The latest syllabus prescribed by NCERT stresses on practical approach to studies, so that the child can learn the basic concepts from things around him/her. Further, the concept of CCE (Continuous and Comprehensive Evaluation) introduced by CBSE seeks to test the knowledge of basic concepts of a child through objective type, very short answer and short answer questions supported by 'fill in the blanks' and 'true/false type' questions.

This new edition of the book is fully in accordance with the principle of CCE.

The salient features of the book are:

- Completely redesigned and re-illustrated.
- The theory is presented in a very simple language and supported with examples from everyday life.
- Adequate number of questions for practice have been given in exercises to enable child to have sufficient drill on each topic.
- The section called **'Activity Time'** in each chapter contains relevant Maths Lab Activities, Fun Activities and Projects.
- A section called **'CCE Drill'** with two parts has been added to each chapter.
    - (a) **Question Bag 1** consisting of Multiple Choice Questions.
    - (b) **Question Bag 2** consisting of a Self Assessment Test in which short answer questions, true/false questions and fill in the blanks have been given.

Suggestions for any improvement in the book are always welcome.

Contents

1 Revision

Exercise 1

1. Fill in the blanks.

(a) The largest 4-digit number is ....

(b) The smallest 4-digit number is ....

(c) The place value of 8 in 3486 is ....

(d) The predecessor of 3000 is ....

(e) The successor of 6899 is ....

(f) The place value of .... always remains the same.

(g) The largest 4-digit number formed using four different digits is ....

(h) The smallest 4-digit number formed using four different digits is ....

2. Write the following numerals in words.

(a) 5476	(b) 3940	(c) 9700	(d) 6019
(e) 8060	(f) 5803	(g) 7001	(h) 1011

3. Write the following numbers in figures.

(a) Eight thousand six hundred two	(b) Five thousand one hundred
(c) Four thousand seventy	(d) Nine thousand nine
(e) Three thousand fourteen	(f) Eight thousand eight hundred eighty
(g) One thousand two	(h) Seven thousand thirty-one
(i) Three thousand thirty	(j) Six thousand six hundred six
(k) Five thousand ten	(l) Nine thousand five hundred

4. Write the place value and face value of each digit in 8347.

5. Find the difference between the place values of two sevens occurring in 7875.

6. Find the difference between the place value of 3 in 5396 and 5 in 7952.

7. Write each of the following numerals in expanded form.

(a) 8629	(b) 9470	(c) 5309
(d) 6054	(e) 7050	(f) 4810

8. **Write each of the following in short form.**

(a) 4000 + 500 + 60 + 1 = ...

(b) 5000 + 80 + 7 = ...

(c) 7000 + 700 + 7 = ...

(d) 9000 + 10 + 9 = ...

(e) 6000 + 30 = ...

(f) 8000 + 5 = ...

9. Counting by fives write the numerals from 3037 to 3072.

10. Counting by fifteens write the numerals from 9023 to 9113.

11. Counting by fifties write the numerals in reverse order from 2010 to 1660.

12. **Look at the pattern and fill in the blanks.**

(a) 16, 23, 30, 37, ..., ..., ..., ...

(b) 165, 180, 195, 210, ..., ..., ..., ...

(c) 1050, 1100, 1150, 1200, ..., ..., ..., ...

(d) 9050, 9090, 9130, 9170, ..., ..., ..., ...

(e) 915, 895, 875, 855, ..., ..., ..., ...

13. **Compare the numbers and put the correct symbol >, < or = in the placeholder.**

(a) 1001 ☐ 996 (b) 5406 ☐ 5460 (c) 9007 ☐ 9070

(d) 3214 ☐ 3124 (e) 6896 ☐ 6986 (f) 9990 ☐ 9909

14. **Arrange the following numbers in ascending order.**

(a) 7896, 6978, 8967, 9687, 6897, 7968

(b) 7707, 7070, 7700, 7007, 7077, 7777

(c) 5410, 5014, 5104, 5041, 5401, 5140

(d) 6357, 5763, 6735, 6375, 5637, 5376

15. **Arrange the following numbers in descending order.**

(a) 4003, 3004, 3400, 3043, 4033, 4303

(b) 5062, 5620, 5206, 5602, 5026, 5260

(c) 8088, 8808, 8008, 8080, 8800, 8888

(d) 5545, 5454, 5455, 5445, 5554, 4555

16. **Write the smallest 4-digit number using each of the digits only once.**

(a) 8, 5, 1, 6 (b) 5, 7, 0, 2

17. **Write the greatest 4-digit number using each of the digits only once.**

(a) 3, 9, 7, 2 (b) 6, 4, 0, 8

18. Add:

(a)	(b)	(c)	(d)
6348	3986	8365	6795
1479	2837	879	1978
+ 1865	+ 2045	+ 84	174
			+ 98

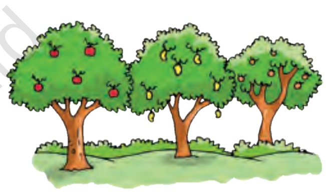
19. Fill in the blanks.

(a) 9067 + 1837 = 1837 + ...

(b) 1088 + (7605 + 5067) = (1088 + ...) + 5067

(c) .... + 4784 = 4784

20. In a fruit orchard, there are 1978 apple trees, 2563 mango trees and 3075 guava trees. How many fruit trees in all are there in the orchard?



21. In a village, the number of males is 758 more than the number of females. If the number of females is 3246, what is the total population of the village?

22. Subtract:

(a) 986 from 5403 (b) 5096 from 8001

(c) 3684 from 7600 (d) 3497 from 9205

23. In an election, there were two candidates. The winning candidate polled 6215 votes and won by a margin of 1659 votes. How many votes did the defeated candidate receive?

24. What must be added to 3689 to get 5011?

25. What must be subtracted from 7023 to get 4867?

26. The sum of two numbers is 6103. If one of these numbers is 2985, what is the other number?

27. The difference of two numbers is 5689. If the smaller of the two is 1796, what is the larger one?

28. Simplify:

(a) 3978 + 4896 − 2987 (b) 6680 + 1740 − 3995

(c) 6908 − 4929 + 623 (d) 615 + 2143 − 1869

(e) 9312 − 3786 − 4112 (f) 8000 − 3123 + 2534

29. Fill in the blanks.

(a) 287 × 10 = ... (b) 49 × 100 = ...

(c) 925 × 10 = ... (d) 4 × 1000 = ...

(e) 28 × 300 = ... (f) 19 × 500 = ...

30. Find the following products.

(a) 537 × 9 (b) 746 × 8 (c) 634 × 12

(d) 478 × 40 (e) 73 × 37 (f) 146 × 45

(g) 154 × 48 (h) 105 × 56 (i) 116 × 74

31. A man saves ₹ 78 per month. How much will he save in 4 years?

32. One bale of cotton costs ₹ 789. How much will one dozen bales cost?

33. All the 67 students of Class 4 in a school planned to go on a picnic. Each contributes ₹ 125. How much amount has been collected?

34. Work out the following division sums and find the quotient and remainder in each case.

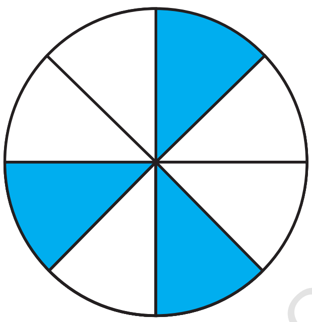
(a) 306 ÷ 8 (b) 3008 ÷ 7 (c) 9917 ÷ 9 (d) 4000 ÷ 6

35. Seven persons together planned a picnic. If they collected ₹ 4158 in all, how much was contributed by each person?

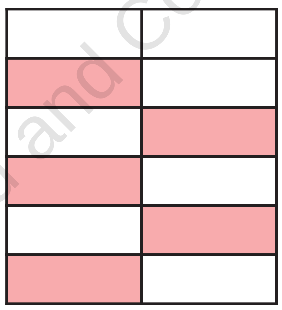
36. 6190 candles are to be packed in boxes of 9 candles each. How many boxes will be required? How many candles will be left?

37. Write the fraction showing the shaded part in each of the following figures.

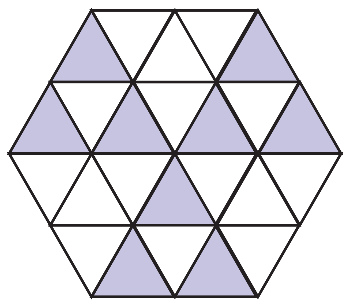
(a)



(b)

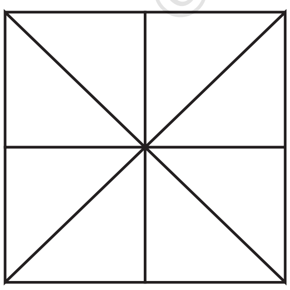


(c)



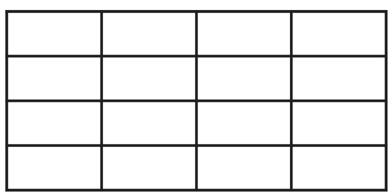
38. Shade a part of each whole to represent the given fraction.

(a)



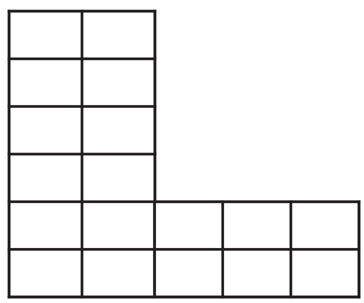
$\frac{5}{8}$

(b)



$\frac{7}{16}$

(c)



$\frac{10}{18}$

39. Solve:

(a) $\frac{1}{3}$ of 15 = ☐ (b) $\frac{1}{4}$ of 28 = ☐ (c) $\frac{1}{9}$ of 54 = ☐

40. Add:

(a) 65 rupees 85 paise and 19 rupees 20 paise

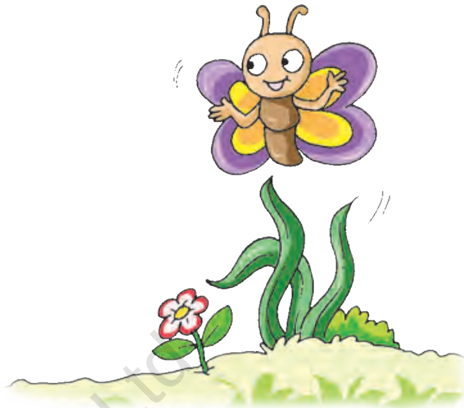
(b) 109 rupees 75 paise, 267 rupees 95 paise and 76 rupees 25 paise

(c) 26 m 52 cm, 17 m 60 cm and 6 m 25 cm

(d) 10 km 575 m, 8 km 285 m and 2 km 175 m

(e) 19 kg 205 g, 22 kg 456 g and 28 kg 630 g

(f) 18 L 175 mL, 9 L 785 mL and 7 L 80 mL



41. Subtract:

(a) 17 rupees 95 paise from 26 rupees 10 paise

(b) ₹ 43.75 from ₹ 100

(c) 12 m 46 cm from 23 m 30 cm

(d) 8 km 475 m from 12 km 60 m

(e) 14 L 325 mL from 16 L

42. Choose the correct unit of measurement (kg, g, km, m, cm, L, mL) and fill in the blanks.

(a) Weight of a book ______

(b) Weight of a sack of flour ______

(c) Distance between Mumbai and Goa ______

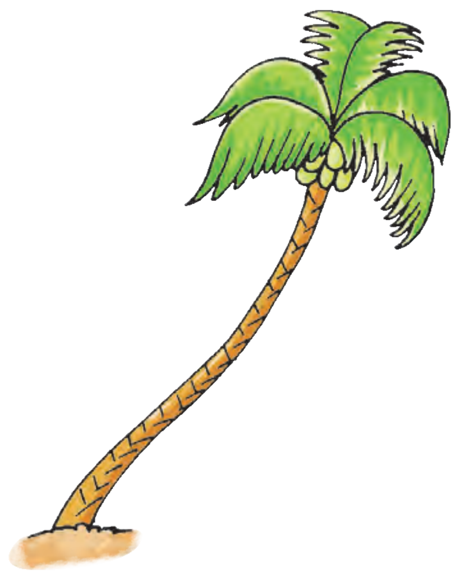
(d) Height of a tree ______

(e) Length of a race track ______

(f) Length of a straw ______

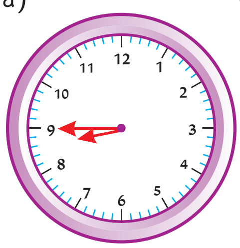
(g) Nasal drop in a bottle ______

(h) Oil in an oil tanker ______

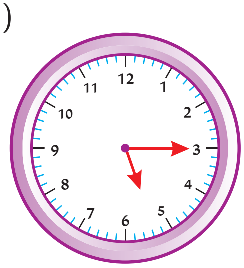


43. Look at each of the clocks and write the time shown by it in all possible ways.

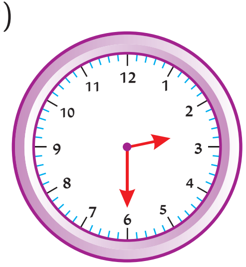
(a)



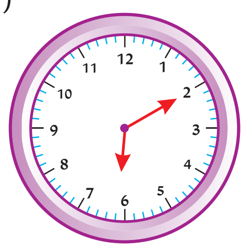
(b)



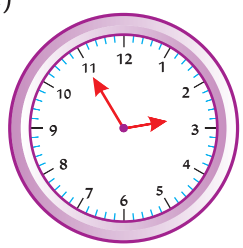
(c)



(d)



(e)



44. Fill in the blanks.

(a) The month which has neither 30 nor 31 days is ....

(b) Two consecutive months which have 31 days each are .... and ....

(c) The months of the year which have 30 days each are ...., ..., ... and ....

(d) An ordinary year has .... days while a leap year has .... days.

(e) There are .... years in a decade.

45. State whether each of the following statements is true or false.

(a) A line has no end points. ....

(b) Ray $\overrightarrow{AB}$ is the same as ray $\overrightarrow{BA}$. ....

(c) A ray has a definite length. ....

(d) Every square is a rectangle. ....

(e) A cuboid has 8 edges and 8 vertices ....

(f) A cylinder has 2 edges and 2 vertices. ....

(g) A cone and a sphere have only one edge. ....

(h) Each face of a cube is a square. ....

46. Complete the following table.

	Solid	Vertices	Faces	Edges
(a)	Cuboid			
(b)	Cube			
(c)	Cylinder			
(d)	Cone			
(e)	Sphere			

2 Roman Numerals

In Class 3, we have learnt reading and writing of Roman numerals up to 39 (XXXIX). In this section, we shall extend learning of reading and writing of these numerals up to 100.

We already know that there are seven basic symbols to write any Roman numeral.

These symbols with their corresponding Hindu-Arabic numerals are given below.

Roman Numeral	I	V	X	L	C	D	M
Hindu-Arabic Numeral	1	5	10	50	100	500	1000

In the Roman system, there is no symbol for zero.

This system is also not a place value system.

Basic Rules to form Roman Numerals

Rule 1: Repetition of a Roman numeral means addition.

Examples: II = 1 + 1 = 2, III = 1 + 1 + 1 = 3,

XX = 10 + 10 = 20, XXX = 10 + 10 + 10 = 30.

Caution: (1) Only I, X, C and M can be repeated. V, L and D cannot be repeated.

(2) No numeral can be repeated more than three times.

Rule 2: A smaller numeral written to the right of a larger numeral is always added to the larger numeral.

Examples: VI = 5 + 1 = 6, VII = 5 + 1 + 1 = 7, VIII = 5 + 1 + 1 + 1= 8,

XI = 10 + 1 = 11, XII = 10 + 1 + 1 = 12, XV = 10 + 5 = 15,

LX = 50 + 10 = 60, LXX = 50 + 10 + 10 = 70.

Rule 3: A smaller numeral written to the left of a larger numeral is always subtracted from the larger numeral.

Examples: IV = 5 – 1 = 4, IX = 10 – 1 = 9,

XL = 50 – 10 = 40, XC = 100 – 10 = 90.

Caution: (1) V, L and D are never subtracted.

(2) I can be subtracted from V and X.

(3) X can be subtracted from L and C.

Rule 4: When a smaller numeral is placed between two larger numerals, then it is always subtracted from the larger numeral immediately following it.

Examples: XIV = 10 + (5 – 1) = 14, XIX = 10 + (10 – 1) = 19.

Writing Roman Numerals for Hindu-Arabic Numerals up to 100

The numerals 1 to 9 and 10, 20, 30, 40, ..., 100 can be written in Roman numerals using the above rules as shown below.

Hindu-Arabic Numeral	Roman Numeral	Hindu-Arabic Numeral	Roman Numeral
1	I	10	X
2	II	20	XX
3	III	30	XXX
4	IV	40	XL
5	V	50	L
6	VI	60	LX
7	VII	70	LXX
8	VIII	80	LXXX
9	IX	90	XC
		100	C

When we write any number up to 100 in Roman numeral, we separate the tens and ones and then first write the Roman numeral for the tens and then write the Roman numerals for the ones to the right of it.

Thus, we have:

(a) 52 = 50 + 2
= LII

(b) 67 = 60 + 7
= LXVII

(c) 78 = 70 + 8
= LXXVIII

(d) 49 = 40 + 9
= XLIX

(e) 84 = 80 + 4
= LXXXIV

(f) 96 = 90 + 6
= XCVI

Similarly, we have:

(a) XCVIII = 90 + 8 = 98.

(b) LXXI = 70 + 1 = 71.

(c) LXIX = 60 + 9 = 69.

(d) XLIV = 40 + 4 = 44.

Exercise 2

1. **Write the Roman numeral for each of the following Hindu-Arabic numerals.**

(a) 44	(b) 38	(c) 95	(d) 69	(e) 87
(f) 92	(g) 66	(h) 54	(i) 85	(j) 99

2. **Write the Hindu-Arabic numerals corresponding to each of the following.**

(a) XXIX	(b) XLV	(c) LXXXIX	(d) XCIX	(e) XLIX
(f) LXXVIII	(g) XCIV	(h) LV	(i) XXXIX	(j) LXIV

3. **Which of the following are meaningless?**

(a) VL	(b) IVC	(c) IXX	(d) XCI	(e) IC
(f) XLIV	(g) LIV	(h) XLIX	(i) VVII	(j) LIL

4. **Compare and put the correct symbol >, < or = in the placeholder.**

(a) LXII ☐ XLII	(b) XXXV ☐ XXVIII	(c) XXXIV ☐ XXXVI
(d) XXIX ☐ XXXI	(e) XCIX ☐ XCIV	(f) XLV ☐ LXV

Activity Time

Take some matchsticks or toothpicks and use them to form Roman numerals using only I, V, X and L. Begin with 2 matchsticks and use them to form the greatest and the smallest possible Roman numerals which are  and  respectively. Proceed in a similar fashion with 3, 4, 5, 6,... matchsticks and then complete the table shown below.

Matchsticks	Largest Roman numeral	Smallest Roman numeral
2	L	II
3	LI	III
4	LX	VII
5		
6		
7		
8		
9		
10		

C.C.E. Drill 1

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. The Roman numerals from which I can be subtracted are V and..................... .

(a) I (b) X (c) L (d) C

2. Which of the following is meaningless?

(a) XIV (b) XIX (c) IXVI (d) XXVI

3. 99 is the same as

(a) IC (b) IXIX (c) XCIX (d) CIX

4. In the Roman system, the symbol for zero is

(a) 0 (b) X – X (c) does not exist (d) None of these

5. 22 is written in Roman numerals as

(a) XXII (b) XVVII (c) VVVVII (d) None of these

6. Which of the following statements is false?

(a) V, L and D are never subtracted.

(b) I can be subtracted from V and X only once.

(c) X cannot be subtracted from L.

(d) No Roman numeral can be added more than 3 times.

7. Which of the following is correctly matched?

(a) 15 ⟶ VVV (b) 19 ⟶ XIX

(c) 31 ⟶ XXVVI (d) 25 ⟶ XVX

8. The Roman numeral for 89 is

(a) IXC (b) LXXXIX (c) XXCIX (d) LXXXVIV

9. XIX + XXX = ...

(a) XLIX (b) L (c) XXXIX (d) LIX

10. IX + XV + XX = ...

(a) 35 (b) 40 (c) 44 (d) 45

11. XL – ...... = XXIX

(a) XI (b) XIX (c) XXI (d) XXIX

QUESTION BAG 2

1. Complete the following table.

Hindu-Arabic Numeral	40		68		97		88
Roman Numeral		XLIX		XC		LXXIX	

2. Compare.

(a) 58 + 28 ☐ LXXXIV (b) LXX ☐ 100 – 36

(c) XLIV ☐ 9 × 6 (d) 81 – 32 ☐ L

3. Fill in the blanks.

(a) There are .... symbols in Roman numerals.

(b) Symbols ...., ... and .... can be both added and subtracted.

(c) Symbols .... and .... are neither repeated nor added or subtracted.

4. Write the answers in Roman numerals.

(a) 6 × 7 = ☐ (b) 8 × 8 = ☐

(c) 40 + 50 = ☐ (d) 960 ÷ 10 = ☐

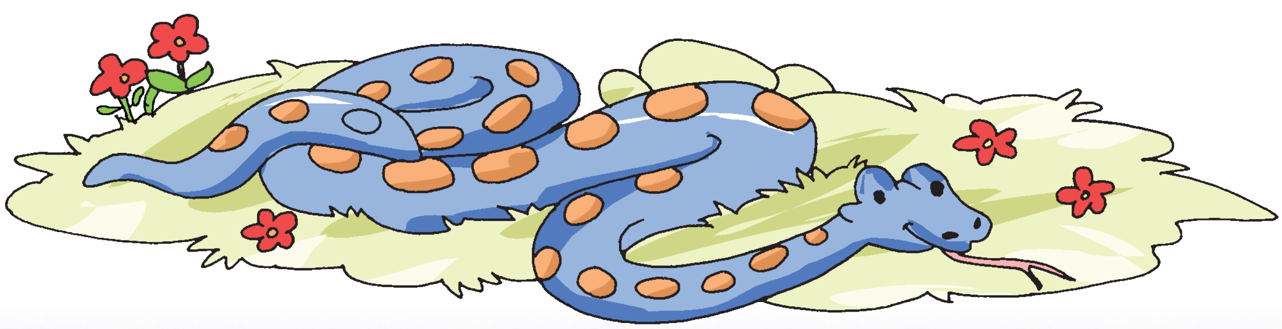
(e) 70 – 25 = ☐ (f) 7 × 9 = ☐

5. Perform the indicated operation and write the answer in Roman numerals.

(a) LXXX ÷ VIII = ☐ (b) VI × XV = ☐

(c) XXVIII + XXVII = ☐ (d) XXV ÷ V = ☐

(e) LXXXIII – XLVI = ☐



3 Number System

Number and Numeral

We may express numbers in figures as well as in words.
The group of figures representing a number is called the numeral for that number.

5-digit and 6-digit Numbers

In Class 3, we have studied up to 4-digit numbers. We know that:

The smallest 4-digit number is 1000.

The largest 4-digit number is 9999.

The number 1 more than 9999 is 10000.

We read 10000 as ten-thousand.

The smallest 5-digits number is 10000.

Thus, in the place value chart, the fifth place from right is called the ten thousands place.

TTh	Th	H	T	O

Thus, we have larger numbers as given below.

Numeral	Read as
10000	Ten thousand
10001	Ten thousand one
10002	Ten thousand two
⋮	⋮
10010	Ten thousand ten
⋮	⋮
10099	Ten thousand ninety-nine
10100	Ten thousand one hundred
⋮	⋮
10900	Ten thousand nine hundred
⋮	⋮
10999	Ten thousand nine hundred ninety-nine
11000	Eleven thousand
11001	Eleven thousand one
⋮	⋮
99000	Ninety-nine thousand
⋮	⋮
99999	Ninety-nine thousand nine hundred ninety-nine

The largest 5-digit number is 99999.

The number 1 more than 99999 is 100000. We read 100000 as one lakh.

The smallest 6-digit number is 100000.

Thus, in the place value chart, the sixth place from the right is the lakhs place.

Proceeding as in the above table, we start from 100000 and reach up to 999999.

The largest 6-digit number is 999999.

The number 1 more than 999999 is 1000000. We read 1000000 as ten lakh.

The smallest 7-digit number is 1000000.

The seventh place in a number is called the ten lakhs place.

The greatest 7-digit number is 9999999.

Indian Number System

The number system that we have learnt above is the Indian number system.

It is also called the Hindu-Arabic system of numeration.

In this system, we have the place value chart as shown below.

Periods →	**Lakhs**		**Thousands**		**Ones**		
Places →	Ten Lakhs 1000000	Lakhs 100000	Ten Thousands 10000	Thousands 1000	Hundreds 100	Tens 10	Ones 1
	TL	L	TTh	Th	H	T	O

The seven places have been grouped into three periods or bunches:

(a) The first three places make the ones period.

(b) The next two places make the thousands period.

(c) The next two places make the lakhs period.

International Number System

This system is followed by a large number of countries (especially the western countries) in the world.

In this system, we write:

1 lakh = 100 thousands

10 lakhs = 1 million

Thus, we have periods of ones, thousands and millions.

International Place Value Chart

Periods →	Millions			Thousands			Ones		
Places →	Hundred Millions 100000000	Ten Millions 10000000	Millions 1000000	Hundred thousands 100000	Ten thousands 10000	Thousands 1000	Hundreds 100	Tens 10	Ones 1
	HM	TM	M	HTh	TTh	Th	H	T	O

Reading and Writing a Numeral

While reading a numeral, all the digits in the same period are read together and the name of the period (except the ones) is read along with it.

While writing a numeral, we separate the periods using commas.

Study the following examples.

Solved Examples

Example 1: Write each of the following numerals in the Indian system by separating the periods, using commas.

(a) 13645 (b) 39087 (c) 105674

(d) 1370654 (e) 3650009 (f) 267509

Solution: Separating the periods of ones, thousands and lakhs from right, we may write:

	Given Numeral							Using Commas
	TL	L	TTh	Th	H	T	O	
(a)			1	3	6	4	5	13,645
(b)			3	9	0	8	7	39,087
(c)		1	0	5	6	7	4	1,05,674
(d)	1	3	7	0	6	5	4	13,70,654
(e)	3	6	5	0	0	0	9	36,50,009
(f)		2	6	7	5	0	9	2,67,509

Example 2: Write the number name for each of the following numerals in the Indian system.

(a) 30207 (b) 480695 (c) 360018

(d) 1636506 (e) 1400008 (f) 1836054

Solution: We first arrange the given numerals in the place value chart. Separating the periods of ones, thousands and lakhs from right, in each numeral, we may read:

	Given Numeral							Number Name
	TL	L	TTh	Th	H	T	O	
(a)			3	0	2	0	7	Thirty thousand two hundred seven
(b)		4	8	0	6	9	5	Four lakh eighty thousand six hundred ninety-five
(c)		3	6	0	0	1	8	Three lakh sixty thousand eighteen
(d)	1	6	3	6	5	0	6	Sixteen lakh thirty-six thousand five hundred six
(e)	1	4	0	0	0	0	8	Fourteen lakh eight
(f)	1	8	3	6	0	5	4	Eighteen lakh thirty-six thousand fifty-four

Points to Note:

(a) Do not write the periods in plural.
Never write 9347 as Nine thousands three hundreds forty-seven.
Correct form is: Nine thousand three hundred forty-seven.

(b) Do not use the word ‘and’ before tens and ones.
Reading 9347 as Nine thousand three hundred and forty-seven, is wrong.
Here ‘and’ should not be used.

Example 3: Rewrite the following numbers with proper commas, using the International place value chart.

(a) 634782 (b) 1362475 (c) 48237596

Solution: Arranging the given numbers in an International place value chart and separating the periods, we may write:

	Given Numeral									Using Commas
	HM	TM	M	HTh	TTh	Th	H	T	O	
(a)				6	3	4	7	8	2	634,782
(b)			1	3	6	2	4	7	5	1,362,475
(c)		4	8	2	3	7	5	9	6	48,237,596

Example 4: **Write the number names of the following numerals in the International system.**

(a) 471685 (b) 2304019 (c) 36149708

Solution: We first arrange the given numerals in the International place value chart. Separating the periods, we may write the number names of the given numerals as shown below.

	Given Numeral									Number Name
	HM	TM	M	HTh	TTh	Th	H	T	O	
(a)				4	7	1	6	8	5	Four hundred seventy-one thousand six hundred eighty-five
(b)			2	3	0	4	0	1	9	Two million three hundred four thousand nineteen
(c)		3	6	1	4	9	7	0	8	Thirty-six million one hundred forty-nine thousand seven hundred eight

Exercise 3

1. **Arrange the following numerals in the Indian place value chart and then rewrite them with commas at the right places.**

   (a) 5020 (b) 23617 (c) 80003 (d) 316594
   (e) 200105 (f) 610056 (g) 2003500 (h) 1560034

2. **Write the following numerals in words in the Indian system.**

   (a) 53106 (b) 24683 (c) 59019 (d) 319546
   (e) 204071 (f) 500005 (g) 3033030 (h) 4040400
   (i) 6666666 (j) 6152496

3. **Express the following numbers written in the Indian system in figures, placing the commas at the right places.**

   (a) Fifteen thousand six hundred eighty-two
   (b) Twenty-five thousand nine
   (c) Sixty thousand fifty-nine
   (d) Nineteen thousand one
   (e) Two lakh fifty-six thousand two hundred fourteen
   (f) Three lakh three thousand fifteen
   (g) Four lakh sixty-seven
   (h) Ten lakh twenty
   (i) One lakh one
   (j) Twelve lakh three thousand nine
   (k) Seventy-nine lakh fifty thousand thirty
   (l) Eight lakh one thousand seven

4. **Write in figures as well as in word.**

(a) the smallest 5-digit number
(b) the largest 5-digit number
(c) the smallest 6-digit number
(d) the largest 6-digit number
(e) the smallest 7-digit number
(f) the largest 7-digit number

5. **Rewrite the following numerals with proper commas, using International place value chart.**

(a) 364619
(b) 509067
(c) 1679102
(d) 4056098
(e) 5100309
(f) 12317007

6. **Write the number names of the following in the International system.**

(a) 360520
(b) 603097
(c) 1400317
(d) 5059082
(e) 7010008
(f) 10300103

7. **Using the International place value chart, write the numeral for each of the following numbers, placing the commas at the right places.**

(a) Three hundred five thousand six hundred eighty-two
(b) Five hundred thousand, ninety-nine
(c) One million one hundred sixty-four thousand two hundred
(d) Two million three hundred ten thousand one hundred eight
(e) Ten million nine hundred nine thousand nine hundred ninety-nine
(f) Twenty-one million six hundred one thousand six

Face Value and Place Value

Face Value of a Digit in a Numeral

The face value of a digit in a numeral is the value of the digit itself at whatever place it may be.

Thus, in the numeral 53472:

The face value of 2 is 2.

The face value of 7 is 7.

The face value of 4 is 4, and so on.

Place Value of a Digit in a Numeral

Place value of a digit = Face value of the digit × Value of the place

Remember: Place value of 0 is always 0, wherever it may be.

Example 1: **Find the place value of each of the digits in 12,39,746.**

Solution: We may write the given numeral as:

TL	L	TTh	Th	H	T	O
1	2	3	9	7	4	6

From the place value chart, we have the following:

Place value of 6 = 6 ones = 6 × 1 = 6.

Place value of 4 = 4 tens = 4 × 10 = 40.

Place value of 7 = 7 hundreds = 7 × 100 = 700.

Place value of 9 = 9 thousands = 9 × 1,000 = 9,000.

Place value of 3 = 3 ten thousands = 3 × 10,000 = 30,000.

Place value of 2 = 2 lakhs = 2 × 1,00,000 = 2,00,000.

Place value of 1 = 1 ten lakh = 1 × 10,00,000 = 10,00,000.

Expanded Notation

In the above example, we saw the place value of each digit in the number 12,39,746.

Here, 12,39,746 can be expressed in the expanded form as:

10,00,000 + 2,00,000 + 30,000 + 9,000 + 700 + 40 + 6. This is the expanded form of the number.

The numeral 12,39,746 is the ordinary or short form.

Example 2: **Write 9,65,703 in the expanded form.**

Solution: The given numeral may be written as:

L	TTh	Th	H	T	O
9	6	5	7	0	3

∴ 965703 = 9 lakhs + 6 ten thousands + 5 thousands + 7 hundreds + 0 tens + 3 ones

= 9 × 1,00,000 + 6 × 10,000 + 5 × 1,000 + 7 × 100 + 0 × 10 + 3 × 1

= 9,00,000 + 60,000 + 5,000 + 700 + 3.

Successor and Predecessor

Successor of a Number

The successor of a number is 1 more than the number.

Thus, the successor of 9999 is 10000.

the successor of 85293 is 85294.

Predecessor of a Number

The predecessor of a number is 1 less than the number.

Thus, the predecessor of 60700 is 60699.

the predecessor of 100000 is 99999.

Skip Counting

Suppose, starting with a given number, we write a sequence of numbers with a fixed gap between two successive numbers, then such a counting is known as skip counting.

Counting by twos means there is a gap of 2 in every two successive numbers.

Counting by tens means there is a gap of 10 in every two successive numbers, and so on.

Example 3: Counting by fives write numbers from 26819 to 26844.

Solution: The required numbers are:

26819, 26824, 26829, 26834, 26839, 26844.

Exercise 4

1. Find the place value of the underlined digit in each of the following numerals.

(a) 10,7$\underline{9}$1 (b) 2$\underline{3}$,076 (c) $\underline{4}$6,307 (d) 2,35,9$\underline{6}$1
(e) $\underline{8}$,37,209 (f) $\underline{5}$2,47,296 (g) 3$\underline{5}$,61,909 (h) $\underline{9}$,75,600

2. Find the place value of each of the digits in the following numerals.

(a) 43,217 (b) 61,450 (c) 2,13,504 (d) 38,60,429

3. Find the difference between the place value and face value of 6 in 4,61,503.

4. Find the difference between the place values of 3 and 7 in the numeral 1,03,476.

5. Find the difference between the place values of 8 in 48,96,500 and 15,80,776.

6. Write each of the following numbers in expanded form.

(a) 24,308 (b) 1,23,527 (c) 3,09,057
(d) 4,29,010 (e) 16,07,503 (f) 80,60,719

7. Write each of the following in short form.

(a) 10,000 + 3,000 + 500 + 70 + 8 = ...
(b) 30,000 + 700 + 80 + 4 = ...
(c) 50,000 + 40 + 3 = ...
(d) 90,000 + 1 = ...
(e) 2,00,000 + 4,000 + 100 + 3 = ...
(f) 30,00,000 + 60,000 + 500 = ...
(g) 5,00,000 + 3,000 + 7 = ...

8. Write the successor of each of the following numbers.

(a) 13,579 (b) 23,009 (c) 29,099 (d) 34,999
(e) 4,51,399 (f) 28,67,009 (g) 35,59,999 (h) 99,99,299

9. Write the predecessor of each of the following numbers.

(a) 39,000 (b) 43,700 (c) 69,100 (d) 1,20,000
(e) 4,05,000 (f) 28,60,100 (g) 66,31,700 (h) 68,10,000

10. Counting by twos write the numbers from 10,529 to 10,541.

11. Counting by twenties write the numbers from 20,499 to 20,619.

12. Counting by hundreds write the numbers from 9,999 to 10,599.

13. Counting by fives write the numbers in reverse order from 10,000 to 9,960.

14. Discover the pattern and name the next four numbers.

(a) 7345, 7353, 7361, ..., ..., ..., ...

(b) 10501, 10511, 10521, ..., ..., ..., ...

(c) 23709, 23699, 23689, ..., ..., ..., ...

(d) 20000, 19998, 19996, ..., ..., ..., ...

(e) 100000, 99900, 99800, ..., ..., ..., ...

Comparison of Numbers

We have already learnt the method of finding the greater of the two given numbers up to 4-digit numbers. We follow the same rule for larger numbers.

Rule 1: If two numbers with different number of digits are given, then the number which has more digits is the greater of the two.

Thus, 5983 > 697, since 5983 has 4 digits while 697 has 3 digits.

Rule 2: Suppose we have to compare two numbers with the same number of digits.

Step 1: First compare the digits at the leftmost place in both the numbers.

Step 2: If they are equal in value, compare the second digits from the left in both the numbers.

Step 3: If the second digits from the left are equal, compare the third digits from the left in both the numbers.

Step 4: Continue until you come across unequal digits at the corresponding places.

Now, the number with greater such digit is the greater of the two.

Solved Examples

Example 1: Which is greater: 9875 or 16004?

Solution: Clearly, 9875 consists of 4 digits, while 16004 contains 5 digits.

Since a number with more digits is greater, so 16004 > 9875.

Example 2: Which is greater: 87,951 or 79,865?

Solution: Both are 5-digit numbers.

Compare their leftmost digits i.e., 8 in 87,951 and 7 in 79,865, and, 8 > 7.

∴ 87,951 > 79,865.

Example 3: Compare 6,45,385 and 6,45,403.

Solution: Both the numbers have 6 digits. Both have the same digits at the lakhs, ten thousands and thousands places.

So, we compare the digits at the hundreds place.

This digit is 3 in 6,45,385 and 4 in 6,45,403, and, 3 < 4.

∴ 6,45,385 < 6,45,403.

Ascending and Descending Order

Numbers in ascending order means numbers from the smallest to the greatest.

Numbers in descending order means numbers from the greatest to the smallest.

Example 4: Arrange the following numbers in ascending order.

50,60,713 5,62,302 45,82,916 55,62,310 45,81,996

Solution: Let us arrange the given numbers in a place value chart.

TL	L	TTh	Th	H	T	O
5	0	6	0	7	1	3
	5	6	2	3	0	2
4	5	8	2	9	1	6
5	5	6	2	3	1	0
4	5	8	1	9	9	6

5,62,302 is a 6-digit number, while all others are 7-digit numbers.

∴ 5,62,302 is the smallest number.

Of the remaining numbers, the first and fourth numbers have 5 as the leftmost digit, while the third and fifth numbers have 4 as the leftmost digit.

Since 5 > 4, so the first and fourth numbers are greater than the third and fifth numbers.

Now, we compare 45,82,916 and 45,81,996. Both these numbers have the same digits at the ten lakhs, lakhs and ten thousands places. So, we compare the digits at the thousands place.

This digit is 2 in 45,82,916 and 1 in 45,81,996.

Since 1 < 2, so 45,81,996 < 45,82,916.

Next we compare 50,60,713 and 55,62,310.

Both these numbers have the same digits at the ten lakhs place.

So, we compare their digits at the lakhs place.

This digit is 0 in 50,60,713 and 5 in 55,62,310, and, 0 < 5.

So, 50,60,713 < 55,62,310.

Thus, 5,62,302 < 45,81,996 < 45,82,916 < 50,60,713 < 55,62,310.

Hence, the given numbers arranged in ascending order are:

5,62,302; 45,81,996; 45,82,916; 50,60,713; 55,62,310

Example 5: **Arrange the following numbers in descending order.**

56,99,010   8,90,618   70,62,117   65,86,905   72,69,233

Solution: We first arrange the given numbers in a place value chart.

TL	L	TTh	Th	H	T	O
5	6	9	9	0	1	0
	8	9	0	6	1	8
7	0	6	2	1	1	7
6	5	8	6	9	0	5
7	2	6	9	2	3	3

8,90,618 is a 6-digit number. All others are 7-digit numbers.

∴ 8,90,618 is the smallest number. Among other numbers each of the third and fifth numbers have 7 as the leftmost digit, the fourth number has 6 and the first number has 5 as the leftmost digit, and, 7 > 6 > 5.

So, each of the third and fifth numbers is greater than the fourth number, which in turn is greater than the first number.

Now, let us compare 70,62,117 and 72,69,233. Both the numbers have 7 at the ten lakhs place. So, we compare their digits at the lakhs place.

This digit is 0 in 70,62,117 and 2 in 72,69,233, and, 2 > 0.

So, 72,69,233 > 70,62,117.

Thus, 72,69,233 > 70,62,117 > 65,86,905 > 56,99,010 > 8,90,618

Hence, the given numbers arranged in descending order are:

72,69,233;   70,62,117;   65,86,905;   56,99,010;   8,90,618

Writing the Smallest Number, Using the given Digits, each only Once without Repetition

Case I: When none of the given digits is zero

In this case, we arrange the given digits in ascending order.

Examples:

(a) The smallest 3-digit number formed by using the digits 5, 2 and 6 is 256.

(b) The smallest 4-digit number formed by using the digits 7, 1, 4 and 9 is 1479.

Case II: When one of the given digits is zero

In this case, we put 0 at the second place from the left. We then fill the remaining places from left to right by the remaining digits in an ascending order.

Examples:

(a) The smallest 3-digit number formed by using the digits 0, 3 and 5 is 305.

(b) The smallest 4-digit number formed by using the digits 8, 6, 1 and 0 is 1068.

Writing the Greatest Number, Using the given Digits, each only Once without Repetition

To form the greatest number, we arrange the given digits in descending order.

Examples:

(a) The greatest 3-digit number formed by using the digits 7, 8 and 9 is 987.

(b) The greatest 4-digit number formed by using the digits 0, 5, 7 and 8 is 8750.

Writing the Smallest or Greatest Number, Using the given Digits, when Repetition of Digits is Allowed

In this case, first form the smallest or greatest number using the given digits each only once without repetition. Then, in the number so formed, replace the digit whose repetition is allowed, by the number formed by repeating that digit the allowed number of times.

Exception: If the smallest number is to be formed with one of the digits as zero, then in the number, zero has to be in the second place from the left. Thus, if the digit at the leftmost place is to be repeated twice then the repeated digits lie on either side of the zero in the second place. [See (d) in examples below].

Examples:

(a) The smallest 3-digit number formed by using the digits 1 and 3 repeating 3 twice, is 133.

(b) The smallest 3-digit number formed by using the digits 6 and 7 repeating 6 twice, is 667.

(c) The smallest 4-digit number formed by using the digits 2, 5 and 8 and repeating 8 twice, is 2588.

(d) The smallest 4-digit number formed by using the digits 0, 4 and 6 and repeating 4 twice, is 4046.

(e) The greatest 3-digit number formed by using the digits 4 and 7 repeating 7 twice, is 774.

(f) The greatest 4-digit number formed by using the digits 1, 6 and 9 and repeating 9 twice, is 9961.

Exercise 5

1. **Compare the given pairs of numbers and write the appropriate symbol >, = or < in the placeholder.**

(a)	10,037		9,998	(b)	92,009		92,090
(c)	1,09,050		1,10,005	(d)	1,20,101		1,21,001
(e)	1,70,707		1,77,070	(f)	16,35,037		16,35,073
(g)	10,00,501		9,63,871	(h)	74,61,376		74,61,376
(i)	54,28,022		54,82,022	(j)	57,09,801		59,07,801

2. **Arrange in ascending order.**
   (a) 20,002; 20,200; 22,020; 20,020; 20,220; 22,000
   (b) 50,550; 55,055; 55,505; 50,055; 55,005
   (c) 29,500; 92,100; 29,190; 91,080; 29,009; 90,560
   (d) 7,84,885; 77,935; 9,05,667; 7,48,805; 8,64,171
   (e) 41,09,806; 40,98,065; 4,09,806; 41,09,860; 41,90,806

3. **Arrange in descending order.**
   (a) 10,039; 2,13,500; 16,940; 1,60,940; 27,960; 1,00,013
   (b) 3,01,090; 29,678; 3,03,000; 2,69,090; 31,107; 27,809
   (c) 7,18,906; 77,18,906; 71,890; 7,18,960; 7,81,906
   (d) 5,54,481; 55,06,307; 6,90,002; 5,45,481; 6,90,020
4. **Encircle the largest number among the given numbers.**
   (a) 1,00,300; 1,01,000; 1,00,297; 1,00,403; 1,00,960
   (b) 97,360; 1,00,420; 10,50,000; 1,50,000; 1,01,000
   (c) 5,37,999; 3,40,090; 4,01,970; 4,02,000; 11,00,110
5. **Write the smallest 3-digit number using each of the following digits only once**.
   (a) 5, 7 and 1 (b) 2, 0 and 9 (c) 6, 3 and 4
6. **Write the smallest 4-digit number using each of the following digits only once.**
   (a) 0, 1, 3 and 6 (b) 4, 3, 7 and 5 (c) 9, 8, 2 and 0
7. Write the smallest number of different digits formed by using the digits 3, 1, 0, 5 and 7, each only once.
8. (a) Write the smallest 3-digit number using digits 2 and 7, repeating 7 two times.
   (b) Write the smallest 3-digit number using digits 0 and 5, repeating 5 two times.
   (c) Write the smallest 4-digit number using digits 5, 8 and 2, repeating 8 two times.
   (d) Write the smallest 4-digit number using digits 9, 0, and 7, repeating 7 two times.
9. **Write the greatest 3-digit number using each of the following digits only once.**
   (a) 3, 4 and 9 (b) 8, 0 and 5 (c) 1, 3 and 7
10. **Write the greatest 4-digit number using each of the following digits only once.**
   (a) 1, 6, 8 and 4 (b) 0, 2, 7 and 5

11. (a) Write the greatest 3-digit number using digits 8 and 4, repeating 4 two times.
(b) Write the greatest 4-digit number using digits 7, 2 and 5, repeating 5 two times.
(c) Write the greatest 4-digit number using digits 0, 1 and 6, repeating 6 two times.

12. Write the greatest number of different digits formed by using the digits 2, 4, 0, 3, 6 and 9.

Things to Remember

1. Indian place value chart showing the first seven places is given below.

Lakhs		Thousands		Ones		
Ten Lakhs 1000000	Lakhs 100000	Ten Thousands 10000	Thousands 1000	Hundreds 100	Tens 10	Ones 1
TL	L	TTh	Th	H	T	O

2. In a given numeral, starting from right in the place value chart.
   (a) The first three places make the ones period.
   (b) The next two places make the thousands period.
   (c) The next two places make the lakhs period.
3. The face value of a digit is the digit itself, wherever it may be.
4. Place value of a digit = Its face value × Value of the place
5. The place value of 0 is always 0.
6. A number 1 more than a given number is called its successor.
7. A number 1 less than a given number is called its predecessor.
8. A number having more digits is greater than another having fewer digits.
9. To compare two numbers having the same number of digits, we compare the leftmost digits. If they are equal, we compare the second digits from the left. We proceed in the above manner till we get unequal digits at the corresponding places.

   Now, the number with greater such digit is the greater of the two.
10. Numbers in ascending order means the numbers from the smallest to the greatest.
11. Numbers in descending order means the numbers from the greatest to the smallest.
12. In International place value system, we have:

    1 lakh = 100 thousands and 10 lakhs = 1 million.
13. An International place value chart is given below.

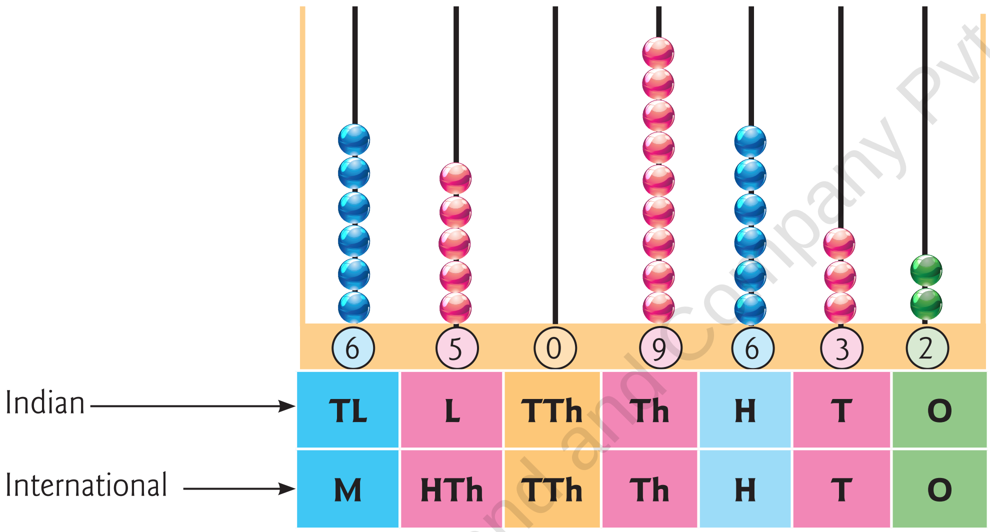
Millions			Thousands			Ones		
Hundred Millions 100000000	Ten Millions 10000000	Millions 1000000	Hundred Thousands 100000	Ten Thousands 10000	Thousands 1000	Hundreds 100	Tens 10	Ones 1
HM	TM	M	HTh	TTh	Th	H	T	O

Activity Time

Making a Model of an Abacus

Using a cardboard sheet or some old cardboard box, construct an open frame for an abacus. Fit thin vertical rods into the frame and label them from left to right as TL, L, TTh, Th, H, T and O to represent Ten lakhs, Lakhs, Ten thousands, Thousands, Hundreds, Tens and Ones places respectively. Select some sort of pearls or beads to put into the rods to represent numbers as shown below. You may also label the rods as per the International place value system.

It will then be possible for you to compare both the systems of numeration.



Clearly, the number shown here may be written as:

1. In the Indian system – 65,09,632

Sixty-five lakh nine thousand six hundred thirty-two

2. In the International system – 6,509,632

Six million five hundred nine thousand six hundred thirty-two

It is also clear from the abacus that:

(a) 1 lakh = 100 thousands (b) 1 million = 10 lakhs

C.C.E. Drill 2

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. Which is the same as 70 tens?

(a) 7 ones ☐ (b) 70 ones ☐ (c) 7 hundreds ☐ (d) 70 hundreds ☐

2. One lakh is a .... digit number.

(a) 5 ☐ (b) 6 ☐ (c) 7 ☐ (d) 4 ☐

3. Which number has a 4 in the ten-thousands place?

(a) 143,863 ☐ (b) 284,713 ☐ (c) 367,849 ☐ (d) 475,206 ☐

4. Which number has the greatest value in the thousands place?

(a) 12,294 ☐ (b) 28,682 ☐ (c) 34,971 ☐ (d) 50,816 ☐

5. Which of the following numerals has commas according to the International system of numeration?

(a) 5,06,085 ☐ (b) 60,05,055 ☐ (c) 87,835 ☐ (d) 606,606 ☐

6. The sum of the place values of two 3s in 396347 is

(a) 303000 ☐ (b) 300300 ☐ (c) 300000 ☐ (d) 330000 ☐

7. The difference between the greatest 4-digit number and the greatest 3-digit number is

(a) 9999 ☐ (b) 9000 ☐ (c) 9090 ☐ (d) 1000 ☐

8. Four lakh one thousand four hundred six is written as

(a) 410406 ☐ (b) 401406 ☐ (c) 4014006 ☐ (d) 4010406 ☐

9. 100 thousands = ... lakh

(a) 1 ☐ (b) 10 ☐ (c) 100 ☐ (d) None of these ☐

10. 1 million = ...thousands

(a) 10 ☐ (b) 100 ☐ (c) 1000 ☐ (d) None of these ☐

11. A 5-digit number begins with .... place.

(a) lakhs ☐ (b) ten lakhs ☐ (c) thousands ☐ (d) ten thousands ☐

12. 1 million – 9 thousands = ...

(a) 1009000 (b) 991000 (c) 919000 (d) 91000

13. How many zeros are there in 10 lakh?

(a) 4 (b) 5 (c) 6 (d) 7

14. The numeral for eleven million eleven thousand eleven is

(a) 111111 (b) 11011011 (c) 1110111 (d) 1101111

15. The difference between the greatest and smallest 4-digit number formed by the digits 0, 1, 2, 3 is

(a) 3087 (b) 3080 (c) 2183 (d) 2187

QUESTION BAG 2

1. Mark the periods of the following numbers in the Indian and International place value systems.

(a) 856943 (b) 688542 (c) 3033030

2. Observe the pattern and fill in the blanks.

(a) 98565, 98575, 98585, ..., ..., ...

(b) 39584, 39684, 39784, ..., ..., ...

(c) 97097, 98097, 99097, ..., ..., ...

(d) 165492, 175492, 185492, ..., ..., ...

(e) 66967, 68967, 70967, ..., ..., ...

3. Observe the periods and write the number names.

(a) 9,84,080 (b) 636,985 (c) 5,050,005 (d) 82,04,044

4. Write each of the following numerals in figures and then rewrite it in words as per the International system of numeration.

(a) Six lakh forty-nine thousand two hundred seventeen

(b) Eighty-nine lakh thirty-two thousand five hundred fifty

5. Find the difference between the place values of 9 and 6 in 9163425.

6. Find the sum of place values of 5 and 7 in 6538704.

7. Write the place, place value and period of the underlined digits.

	Place	Place value	Period
(a) 8$\underline{4}$,20,109			
(b) $\underline{6}$3,10,784			
(c) $\underline{8}$70,096			
(d) 5$\underline{4}$,189			
(e) $\underline{9}$,163,824			
(f) 7,9$\underline{6}$2,105			

8. How many zeros are there in

(a) forty thousand (b) three million (c) nine lakh (d) fifty lakh

9. Compare and put the correct symbol >, < or = in the placeholder.

(a) 1973821 ☐ 1973281

(b) 9063719 ☐ 9063179

(c) 656826 ☐ 658626

(d) 500505 ☐ 505005

(e) 631214 ☐ 63214

(f) 695423 ☐ 694523

(g) 875698 ☐ 895678

(h) 8080808 ☐ 8080880

10. Fill in the blanks.

(a) The place value of 7 in 746328 is ....

(b) The successor of 96965 is ....

(c) The face value of 2 in 20638 is ....

(d) The predecessor of 136490 is ....

(e) 6000000 + 60000 + 600 + 6 = ...

(f) The predecessor of the smallest 7-digit number is ....

(g) The successor of the smallest 6-digit number is ....

(h) The predecessor of the greatest 7-digit number is ....

(i) The successor of the greatest 5-digit number is ....

11. State whether each of the following statements is true or false.

(a) In the Indian system of numeration, there are two places in each period. ....

(b) 7000 = 70 hundreds ....

(c) 2 million is written as 200,000. ....

(d) We add 1 to the largest 5-digit number to get the smallest 6-digit number. ....

12. Arrange the following in ascending order.

(a) 2356841; 2365841; 2356184; 2536841; 2351684

(b) 9090999; 9009999; 9009099; 9909090; 9009090

13. Arrange the following in descending order.

(a) 3876942; 3867429; 3824976; 3842679; 3824679

(b) 8792360; 8729360; 8792630; 8729630; 8972630

14. Compare and put the correct symbol >, < or = in the placeholder.

(a) 20 lakh ☐ 2 million (b) 500,000 ☐ 5 lakh

(c) 6 million ☐ 60,00,000

15. Build the greatest 5-digit number using different digits.

16. Using the digits 9, 0, 5, 2, 4 only once, make:

(a) the smallest 5-digit number.

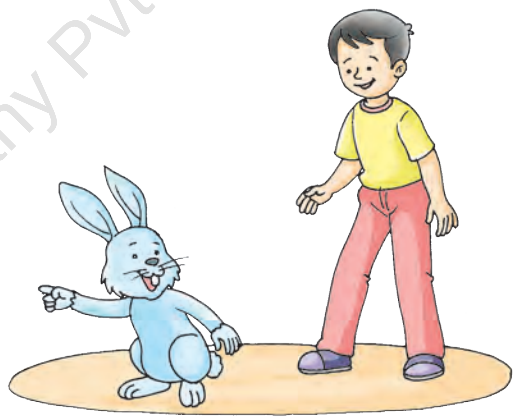
(b) the largest 5-digit number.

(c) the smallest 5-digit number having 0 at tens place.

(d) the smallest 5-digit number having 9 at tens place.

(e) the largest 5-digit number having 0 at thousands place.

(f) the largest 5-digit number having 0 at hundreds place.



17. Form the largest 6-digit number having 0 at tens place and without repeating the digits.

18. Form the smallest 5-digit number having 1 at thousands place and without repeating the digits.

19. Fill in the blanks.

(a) The hundreds place is in the .... period.

(b) 1 lakh = ... hundreds

(c) In the International system of numeration, there are .... places in each period.

(d) One lakh is the smallest .... digit number.

(e) .... period has the same number of places in both the Indian and International systems of numeration.

(f) The Indian and International systems of numeration follow the same pattern up to the .... place.

20. Use the digits 2, 8, 9 to build the greatest and the smallest 5-digit numbers. Each of the digits must be used and repetition of digits is allowed.

4 Addition and Subtraction

Addition

In Class 3, we have learnt the addition of two or more numbers up to 4-digit numbers. We shall extend the same idea of addition to 5-digit and 6-digit numbers.

Addends and Sum: When some numbers are added, then each of the numbers to be added is known as an addend and the result obtained after addition is called the sum.

Addition without Carrying

Rule: Arrange the addends under each other in the place value chart and add them columnwise from right to left, i.e., first add the ones, then the tens, then the hundreds and so on.

Example 1: Add 41367 and 24512.

Solution: Arranging the addends columnwise and adding, we get:

	TTh	Th	H	T	O
	4	1	3	6	7
+	2	4	5	1	2
	6	5	8	7	9

Explanation: We add columnwise, step by step, as shown below:

Step 1: Adding ones: 7 ones + 2 ones = 9 ones.

Step 2: Adding tens: 6 tens + 1 ten = 7 tens.

Step 3: Adding hundreds: 3 hundreds + 5 hundreds = 8 hundreds.

Step 4: Adding thousands: 1 thousand + 4 thousands = 5 thousands.

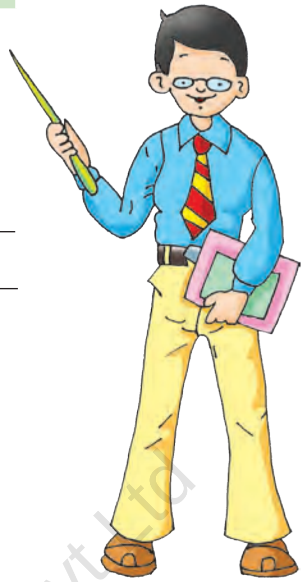
Step 5: Adding ten thousands: 4 ten thousands + 2 ten thousands = 6 ten thousands.

So, the sum of the given addends is 65879.

Example 2: Find the sum: 14243 + 32403 + 1102 + 141.

Solution: Arranging the addends under each other in the place value chart and adding columnwise, we get:

	TTh	Th	H	T	O
	1	4	2	4	3
	3	2	4	0	3
		1	1	0	2
+			1	4	1
	4	7	8	8	9



∴ The required sum is 47889.

Exercise 6

Add:

1.

	3	4	0	2	1
+	2	3	6	5	8

2.

	2	6	5	7	4	3
+	4	3	2	1	2	6

3.

	5	5	7	6	4	2
+	3	2	1	0	5	6

4.

	6	5	7	4	3	6
+	2	3	2	5	4	2

5.

	5	7	6	2	4
	2	1	3	5	1
+	1	1	0	1	2

6.

	5	3	4	2	6
		4	2	3	1
+			1	4	2

7.

	9	5	4	6	0	3
		2	5	1	7	0
+				2	2	4

8.

	7	5	6	3	2	4
		3	1	4	4	5
+			1	2	3	0

Arrange the following numbers in columns and find their sum.

9. 123574, 63312, 2003

10. 225360, 42407, 1131, 101

11. 6307, 21402, 111000, 260

12. 236381, 30516, 2102, 1000

13. 303543, 62104, 3221, 121, 10

Addition with Carrying

Example 1: Add 75364 and 23678.

Solution: Arranging the addends under each other in the place value chart and adding columnwise, we get:

	TTh	Th	H	T	O	
		1	1	1		← Carry
	7	5	3	6	4	
+	2	3	6	7	8	
	9	9	0	4	2	

Explanation: We add columnwise.

Adding ones:

4 ones + 8 ones = 12 ones
= 1 ten + 2 ones.

Write 2 under ones column.

Carry over 1 to the tens place.

Adding tens:

1 ten (carried over) + 6 tens + 7 tens = 14 tens
= 10 tens + 4 tens
= 1 hundred + 4 tens.

Write 4 under tens column.

Carry over 1 to the hundreds place.

Adding hundreds:

1 hundred (carried over) + 3 hundreds + 6 hundreds
= 10 hundreds
= 1 thousand + 0 hundreds.

Write 0 under hundreds column.

Carry over 1 to the thousands place.

Adding thousands:

1 thousand (carried over) + 5 thousands + 3 thousands = 9 thousands.

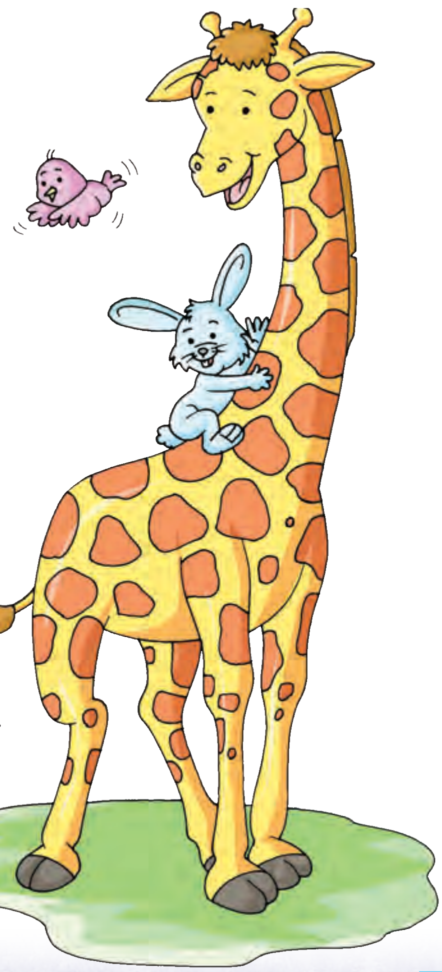
Write 9 under thousands column.

Adding ten thousands:

7 ten thousands + 2 ten thousands = 9 ten thousands.

Write 9 under ten thousands column.

∴ The required sum is 99042.



Example 2: Add 163785 and 438876.

Solution: Arranging the addends under each other in the place value chart and adding columnwise, we get:

	L	TTh	Th	H	T	O	
	1	1	1	1	1		← Carry
	1	6	3	7	8	5	
+	4	3	8	8	7	6	
	6	0	2	6	6	1	

∴ Sum = 602661.

Example 3: Find the sum:

978695 + 69478 + 3589 + 198.

Solution: Arranging the given numbers under each other in the place value chart and adding columnwise, we get:

	TL	L	TTh	Th	H	T	O	
		1	2	1	3	3		← Carry
		9	7	8	6	9	5	
			6	9	4	7	8	
				3	5	8	9	
+					1	9	8	
	1	0	5	1	9	6	0	

∴ The required sum is 1051960.

Example 4: Find the sum:

14 thousands + 18 hundreds + 15 tens

Solution: We have:

14 thousands + 18 hundreds + 15 tens

= 14 thousands + 10 hundreds + 8 hundreds + 10 tens + 5 tens

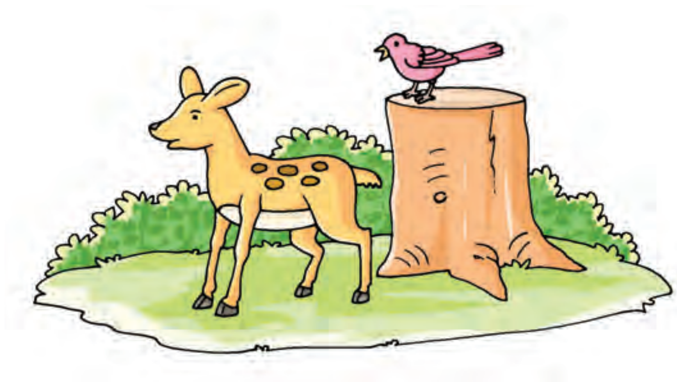
= 14 thousands + 1 thousand + 8 hundreds + 1 hundred + 5 tens

= 15 thousands + 9 hundreds + 5 tens

= Fifteen thousand nine hundred fifty = 15950

Example 5: **Find the missing digits.**

		7	5	$\square$	8
		$\square$	9	2	6
+		4	1	3	5
	1	3	5	8	$\square$



Solution:

Adding ones:

(8 + 6 + 5) ones = 19 ones

= 1 ten + 9 ones.

Write 9 under ones column in the sum.

Carry over 1 to the tens place.

				1 ← Carry	
		7	5	$\square$	8
		$\square$	9	2	6
+		4	1	3	5
	1	3	5	8	$\boxed{9}$

Adding tens:

(1 + 2 + 3) tens = 6 tens.

But, in the sum, there are 8 tens.

∴ The missing digit in the tens place must be 2.

				1 ← Carry	
		7	5	$\boxed{2}$	8
		$\square$	9	2	6
+		4	1	3	5
	1	3	5	8	$\boxed{9}$

Adding hundreds:

(5 + 9 + 1) hundreds = 15 hundreds

= 1 thousand + 5 hundreds.

Write 5 under hundreds column in the sum.

Carry over 1 to the thousands place.

Adding thousands:

(1 + 7 + 4) thousands = 12 thousands.

But, there are 13 thousands in the sum.

∴ The missing digit in the thousands place must be 1.

		1		1	
		7	5	$\boxed{2}$	8
		$\boxed{1}$	9	2	6
+		4	1	3	5
	1	3	5	8	$\boxed{9}$

Exercise 7

Add:

1.

	5	6	3	4	9
+	3	4	7	6	3

2.

	6	9	7	8	5
+	2	7	9	5	8

3.

	2	7	6	5	8	4
+	5	3	7	9	7	8

4.

	9	3	7	6	8
	2	4	5	9	7
+	1	5	6	3	6

5.

	8	6	9	4	5
	2	7	4	9	8
+	2	3	7	6	1

6.

	3	8	9	6	3	1
		5	2	7	0	8
+	6	8	0	7	9	6

7.

	7	7	5	6	2
	1	0	9	0	8
		5	6	3	1
+		9	1	8	6

8.

	2	1	0	5	0	3
		9	5	6	8	7
	7	8	0	3	7	6
+			6	7	5	6

9.

	2	7	3	5	6	4
		6	7	4	9	7
			9	5	4	3
+				1	5	6

10.

	3	6	5	8	4	9
	1	5	6	4	8	2
				6	5	7
+			2	3	0	4

11.

	4	7	5	9	0	6
	5	6	7	1	3	2
	6	0	3	4	6	5
+		1	0	9	2	7

12.

			1	8	9	6
		6	5	1	3	8
	7	0	9	9	2	8
+	9	8	7	3	5	6

Arrange the following numbers in columns and find the sum.

13. 28697, 53086, 47356, 20893

14. 49746, 9654, 13540, 784

15. 64009, 999, 7777, 18584

16. 444444, 44444, 4444, 444

17. 268479, 153107, 96268, 8936

18. 18998, 29999, 199988, 388899

19. Find the sum of the largest 5-digit number, the largest 6-digit number and the smallest 7-digit number.

20. Find the sum.

(a) 12 thousands + 6 hundreds + 14 tens + 16 ones

(b) 8 ten thousands + 4 thousands + 15 hundreds + 12 tens

(c) 14 ten thousands + 5 thousands + 26 hundreds + 24 tens

21. Replace * by the correct digits.

(a)

	6	9	*	5
	*	4	6	9
+		2	4	7
	9	6	5	*

(b)

	3	2	7	*	9
	1	3	4	2	3
+	2	*	1	4	5
	7	1	*	9	*

Properties of Addition of Numbers

1. Order Property of Addition

Example 1: Find the sum: 34968 + 25377.
Also, find the sum: 25377 + 34968.
What do you conclude?

Solution: We have:

	1	1	1	1	←	Carry
	3	4	9	6	8	
+	2	5	3	7	7	
	6	0	3	4	5	

	1	1	1	1	←	Carry
	2	5	3	7	7	
+	3	4	9	6	8	
	6	0	3	4	5	

∴ 34968 + 25377 = 60345 and 25377 + 34968 = 60345.

Conclusion: 34968 + 25377 = 25377 + 34968.

Thus, we can say:

The sum of two numbers does not change when the order of the addends is changed. This is called the order property of addition in numbers.

2. Grouping Property of Addition

Example 2: Find the sum: (27566 + 36847) + 19864

Also, find the sum: 27566 + (36847 + 19864).

What do you conclude?

Solution: We have:

	1	1	1	1	←	Carry
	2	7	5	6	6	
+	3	6	8	4	7	
	6	4	4	1	3	

27566 + 36847 = 64413.

	1	1		←		Carry
	6	4	4	1	3	
+	1	9	8	6	4	
	8	4	2	7	7	

(27566 + 36847) + 19864

= 64413 + 19864 = 84277.

	1	1	1	1	←	Carry
	3	6	8	4	7	
+	1	9	8	6	4	
	5	6	7	1	1	

36847 + 19864 = 56711.

	1	1		←		Carry
	2	7	5	6	6	
+	5	6	7	1	1	
	8	4	2	7	7	

27566 + (36847 + 19864)

= 27566 + 56711= 84277

Conclusion: (27566 + 36847) + 19864 = 27566 + (36847 + 19864)

Thus, we can say:

The sum of three or more numbers does not change even, when their grouping is changed. This is known as the grouping property of addition of numbers.

3. Additive Property of Zero

Example 3: Find the sums: 47632 + 0 and 0 + 47632.

What do you conclude?

Solution: We have:

	4	7	6	3	2
+					0
	4	7	6	3	2

47632 + 0 = 47632

					0
+	4	7	6	3	2
	4	7	6	3	2

0 + 47632 = 47632

Conclusion: 47632 + 0 = 0 + 47632.

Thus, we can say:

The sum of a number and 0 is the number itself.

Exercise 8

Using the properties of addition of numbers, fill in the blanks.

1. 11236 + 19632 = ... + 11236

2. 43594 + 27389 = 27389 + ...

3. (10524 + 13937) + 11059 = 10524 + (13937 + ...)

4. 13000 + (19000 + 27000) = (13000 + 19000) + ...

5. 29113 + (16227 + 13331) = (.................... + 16227) + 13331

6. .... + 21702 = 21702

7. .... + 0 = 23775

8. 51684 + 0 = ...

Word Problems on Addition

Example 1: **A bulb manufacturing factory produced 86325 bulbs in January, 69770 bulbs in February and 107605 bulbs in March. How many bulbs did the factory produce altogether in these three months?**

Solution:

			1	2	1	1	1		← Carry
Number of bulbs produced in January	=			8	6	3	2	5	
Number of bulbs produced in February	=			6	9	7	7	0	
Number of bulbs produced in March	=	+	1	0	7	6	0	5	
Total number of bulbs produced in 3 months	=		2	6	3	7	0	0	

Hence, the total number of bulbs produced in 3 months is 263700.

Example 2: **There are 425693 men, 372817 women and 296084 children in a city. What is the population of that city?**

Solution:

			1	1	1	1	1	1		← Carry
Number of men in the city	=			4	2	5	6	9	3	
Number of women in the city	=			3	7	2	8	1	7	
Number of children in the city	=	+		2	9	6	0	8	4	
Total population of the city	=		1	0	9	4	5	9	4	

Hence, the total population of the city is 1094594.

Example 3. **The cost of a video set is ₹ 18975 and the cost of a TV set is ₹ 8795 more than the video set. What is the cost of the TV set? What is the total cost of the video set and the TV set?**

Solution:

Cost of a video set = ₹ 18975.

Cost of a TV set = ₹ 18975 + ₹ 8795

= ₹ 27770.

	1	1	1	1		← Carry
	1	8	9	7	5	
+		8	7	9	5	
	2	7	7	7	0	

Total cost of the video set and TV set

= ₹ 18975 + ₹ 27770

= ₹ 46745.

	1	1	1			← Carry
	1	8	9	7	5	
+	2	7	7	7	0	
	4	6	7	4	5	

Exercise 9

1. Rajeev purchases a sofa set and a dining set costing ₹ 36875 and ₹ 87365 respectively. How much money he has to pay in all?
2. In an examination, 75974 students passed. If the number of failures be 27797, find the number of students who appeared in the examination.
3. A number exceeds 248555 by 17645. What is that number?
4. Kamal purchased a plot of land for ₹ 65780. He spent ₹ 9870 for levelling the plot and ₹ 137560 on the construction of a flat. What is the total cost of the flat, including land?
5. In a certain year, three sugar factories produced 38947, 47098 and 93907 bags of sugar respectively. How many bags in all were produced by these factories?
6. The population of four blocks in a colony are 27835, 35947, 47608 and 19418 respectively. What is the total population of the colony?
7. In an election, there were four candidates. They received 39456, 24947, 8698 and 978 votes respectively. If 2367 votes were found invalid, how many votes in all, were polled?
8. Ajay's income during the year 2011 was ₹ 167489. Next year, his income increased by ₹ 38798. What was his income in the year 2012? How much did he earn in these two years?
9. In a particular year, the male population of a city was 37989 more than the female population. If the number of females be 148796, what was the male population? What was the total population in that year?
10. In an election, 5648 votes were found invalid. The defeated candidate received 39476 votes. The winning candidate received 13648 votes more than the losing candidate. How many voters were received by the winning candidate? How many total votes were polled?

Subtraction

In Class 3, we have learnt about subtraction without and with borrowing for smaller numbers consisting of 4 or less digits. We use the same idea of subtraction for larger numbers consisting of 5 or more digits.

Minuend, Subtrahend and Difference

In a problem on subtraction, we use the following terms:

The larger number from which we subtract the other number, is known as minuend.

The number which is subtracted is called subtrahend.

The result of subtraction is called the difference between the given numbers.

Subtraction without Borrowing

Rule 1: In order to find the difference between two given numbers, arrange the digits of subtrahend under those of minuend in the place value chart.

Now, subtract columnwise. That is:

Subtract ones from ones, tens from tens, hundreds from hundreds,

thousands from thousands, ten thousands from ten thousands and so on.

Solved Examples

Example 1: **Subtract 42365 from 87596.**

Solution: Here, minuend is 87596 and subtrahend is 42365.

Arrange the digits of the given numbers in column form in the place value chart and subtracting columnwise, we get:

	TTh	Th	H	T	O
	8	7	5	9	6
–	4	2	3	6	5
	4	5	2	3	1

$\therefore$ 87596 – 42365 = 45231.

Explanation:

Subtracting ones: 6 ones – 5 ones = 1 one.
Write 1 under the ones column.

Subtracting tens: 9 tens – 6 tens = 3 tens.
Write 3 under the tens column.

Subtracting hundreds: 5 hundreds – 3 hundreds = 2 hundreds.

Write 2 under the hundreds column.

Subtracting thousands: 7 thousands – 2 thousands = 5 thousands.

Write 5 under the thousands column.

Subtracting ten thousands: 8 ten thousands – 4 ten thousands = 4 ten thousands.

Write 4 under the ten thousands column.

Hence, 87596 – 42365 = 45231.

Example 2: Find the difference between 79654 and 26312.

Solution: Both the given numbers are 5-digit numbers.

Comparing their digits at ten thousands place, we find that 7 > 2.

$\therefore$ 79654 > 26312.

So, the minuend is 79654.

The subtrahend is 26312.

Arranging their digits in place value chart and subtracting columnwise, we get:

	TTh	Th	H	T	O
	7	9	6	5	4
–	2	6	3	1	2
	5	3	3	4	2

Hence, the difference between the given numbers is 53342.

Exercise 10

Subtract:

1.

	TTh	Th	H	T	O
	5	7	6	4	8
–	1	4	2	3	5

2.

	TTh	Th	H	T	O
	9	6	5	8	7
–	4	6	0	5	3

3.

	L	TTh	Th	H	T	O
	3	6	5	7	2	6
–	1	0	1	0	1	6

4.

	L	TTh	Th	H	T	O
	4	5	3	8	0	7
–		3	1	0	0	2

Find the difference.

5.

	8	6	4	9	1
–	5	2	1	6	0

6.

	9	7	4	6	7
–	4	4	4	0	4

7.

	5	3	6	4	2
–		1	4	0	2

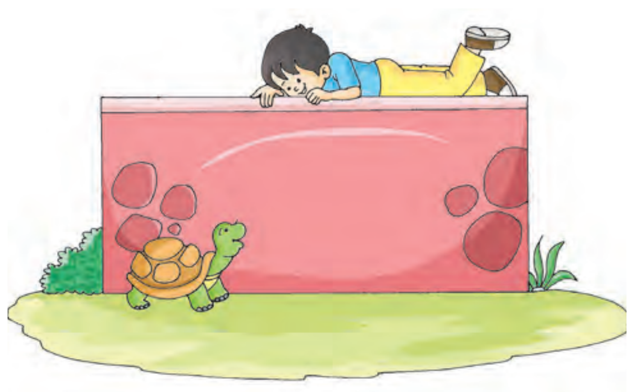
8.

	1	3	9	5	4
–			7	4	3

Find the difference when:

9. minuend = 37486, subtrahend = 21032

10. minuend = 61053, subtrahend = 11031



Write in the column form and find the difference.

11. 62901 – 31600 **12.** 87513 – 63411

13. 51663 – 1441 **14.** 20616 – 504

15. Find the difference between 13564 and 34675.

16. Find the difference between 29946 and 17813.

Fill in the missing numbers.

17.

	9	5	8	7	6	7
–	□	□	4	□	0	5
	2	3	□	4	□	□

18.

	8	6	0	5	4	7
–	2	□	□	2	□	3
	□	3	0	□	2	□

Subtraction with Borrowing

Example 1: Subtract 38967 from 56423.

Solution: Here, minuend = 56423, subtrahend = 38967.

Arranging the digits of the given numbers in column form and subtracting columnwise, we get:

	TTh	Th	H	T	O	
	4	15	13	11	13	← After borrowing
		~~5~~	~~3~~	~~1~~		
	~~5~~	~~6~~	~~4~~	~~2~~	~~3~~	
–	3	8	9	6	7	
	1	7	4	5	6	

∴ 56423 – 38967 = 17456.

Explanation:

Subtracting ones:

We want to subtract 7 from 3. But, 7 > 3.

So, from the tens column, we borrow 1 ten, leaving behind 1 ten.

Now, 1 ten + 3 ones = 10 ones + 3 ones = 13 ones.

∴ 13 ones – 7 ones = 6 ones.

Write 6 under the ones column.

Subtracting tens:

We want to subtract 6 from 1. But, 6 > 1.

So, from the hundreds column, we borrow 1 hundred, leaving behind 3 hundreds.

Now, 1 hundred + 1 ten = 10 tens + 1 ten = 11 tens.

∴ 11 tens – 6 tens = 5 tens.

Write 5 under the tens column.

Subtracting hundreds:

We want to subtract 9 from 3. But, 9 > 3.

So, from the thousands column, we borrow 1 thousand, leaving behind 5 thousands.

Now, 1 thousand + 3 hundreds

= 10 hundreds + 3 hundreds = 13 hundreds.

∴ 13 hundreds – 9 hundreds = 4 hundreds.

Write 4 under the hundreds column.

Subtracting thousands:

We want to subtract 8 from 5. But, 8 > 5.

So, from the ten thousands column, we borrow 1 ten thousand, leaving behind 4 ten thousands.

Now, 1 ten thousand + 5 thousands = 15 thousands.

∴ 15 thousands – 8 thousands = 7 thousands.

Write 7 under the thousands column.

Subtracting ten thousands:

4 ten thousands – 3 ten thousands = 1 ten thousand.

So, write 1 under the ten thousands column.

Thus, 56423 – 38967 = 17456.

Example 2: **Subtract 37643 from 54600.**

Solution: Here, minuend = 54600, subtrahend = 37643.

Arranging the digits of the given numbers under each other in the place value chart and subtracting columnwise, we get:

	TTh	Th	H	T	O
	4	13	15	9	10
		3	5	10	
	~~5~~	~~4~~	~~6~~	~~0~~	~~0~~
–	3	7	6	4	3
	1	6	9	5	7

∴ 54600 – 37643 = 16957.

Explanation:

Subtracting ones:

We want to subtract 3 from 0. But, 3 > 0.

So, we would like to borrow from the tens place.

But there is 0 at tens place.

So, we borrow 1 hundred, leaving behind 5 hundreds.

Now, 1 hundred = 10 tens

= 9 tens + 1 ten = 9 tens + 10 ones.

Thus, we have 5 at hundreds place, 9 at tens place and 10 at ones place.

Now, 10 ones – 3 ones = 7 ones.

Write 7 under the ones column.

Subtracting tens:

9 tens – 4 tens = 5 tens.

Write 5 under the tens column.

Subtracting hundreds:

We want to subtract 6 from 5. But, 6 > 5.

So, we borrow 1 thousand, leaving behind 3 thousands.

Now, 1 thousand + 5 hundreds = 10 hundreds + 5 hundreds

= 15 hundreds.

Now, 15 hundreds – 6 hundreds = 9 hundreds.

Write 9 under the hundreds column.

Subtracting thousands:

We want to subtract 7 from 3. But, 7 > 3.

So, we borrow 1 ten thousand, leaving behind 4 ten thousands.

Now, 1 ten thousand + 3 thousands = 10 thousands + 3 thousands

= 13 thousands.

Now, 13 thousands – 7 thousands = 6 thousands.

Write 6 under thousands column.

Subtracting ten thousands:

4 ten thousands – 3 ten thousands = 1 ten thousand.

Write 1 under the ten thousands column.

Hence, 54600 – 37643 = 16957.

Example 3: Subtract 18765 from 34000.

Solution: Here, minuend = 34000, subtrahend = 18765.

Arranging the digits of the given numbers in column form and subtracting columnwise, we get:

	TTh	Th	H	T	O	
	2	13	9	9	10	← After borrowing
		~~3~~	~~10~~	~~10~~		
	~~3~~	~~4~~	~~0~~	~~0~~	~~0~~	
–	1	8	7	6	5	
	1	5	2	3	5	

∴ 34000 – 18765 = 15235.

Example 4: **What number is 1097 less than 13004?**

Solution: Required number = 13004 – 1097 = 11907.

Working

	TTh	Th	H	T	O
		2	9	9	14
			~~10~~	~~10~~	
	1	~~3~~	~~0~~	~~0~~	~~4~~
–		1	0	9	7
	1	1	9	0	7

Example 5: **What number should be added to 16877 to get 20014?**

Solution: Clearly, the required number is the difference between the given numbers.

∴ Required number = 20014 – 16877 = 3137.

Working

	TTh	Th	H	T	O
	1	9	9	10	14
		~~10~~	~~10~~	~~0~~	
	~~2~~	~~0~~	~~0~~	~~1~~	~~4~~
–	1	6	8	7	7
		3	1	3	7

Example 6: **What number should be subtracted from 32050 to get 3675?**

Solution: Clearly, the required number is the difference between the given numbers.

∴ Required number = 32050 – 3675 = 28375.

Working

	TTh	Th	H	T	O
	2	11	9	14	10
		~~1~~	~~10~~	~~4~~	
	~~3~~	~~2~~	~~0~~	~~5~~	~~0~~
–		3	6	7	5
	2	8	3	7	5

Exercise 11

Subtract:

1.

	4	6	5	7	3
−	2	4	9	4	6

2.

	5	3	2	6	8
−	3	7	1	6	9

3.

	8	7	0	5	2
−	3	7	3	2	8

4.

	6	4	1	0	7
−	2	6	4	6	8

5.

	2	1	3	4	1	6
−	1	2	7	9	6	9

6.

	3	2	4	0	5	7
−	1	3	5	1	7	4

7.

	1	6	2	9	0	3
−		7	8	8	6	4

8.

	2	3	1	2	0	7
−			8	9	8	9

9.

	7	2	0	0	0
−	3	9	8	7	7

10.

	6	0	5	0	0
−	4	8	7	6	4

11.

	2	0	4	0	0
−		8	7	2	6

12.

	2	0	0	0	0	0
−		6	9	5	6	1

Write in columns and find the difference.

13. 31245 – 18756

14. 43016 – 24167

15. 26000 – 19425

16. 123405 – 69547

17. Subtract 9999 from 17777.

18. Subtract 18888 from 25444.

19. Subtract 98567 from 111111.

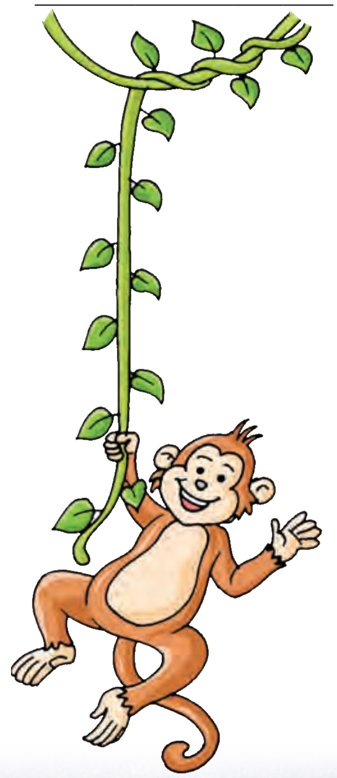
20. Find the difference between 6666 and 10000.

21. Find the difference between 37608 and 51007.

22. Find the difference between 211302 and 52413.

23. Subtract the sum of 35628 and 78756 from 123070.

24. Subtract 195876 from the sum of 138674 and 96578.



25. Subtract:

(a) 16 thousands from 5 ten thousands.

(b) 5 thousands 18 hundreds from 7 thousands 4 hundreds.

(c) 16 lakhs 19 thousands from 34 lakhs.

(d) 3 lakhs 76 thousands from 4 lakhs.

26. What number is 2897 less than 16000?

27. What number should be added to 37654 to get 100000?

28. What number should be subtracted from 22222 to get 9999?

Word Problems on Subtraction

Example 1: Mr Rao earns ₹ 20160 per month. His total monthly expenditure is ₹ 11975. How much does he save every month?

Solution:

Total monthly income = ₹ 20160.

Total monthly expenditure = ₹ 11975.

Monthly saving = ₹ (20160 – 11975)

= ₹ 8185.

Hence, Mr Rao saves ₹ 8185 per month.

	1	9	10	15	10
		10	$\cancel{0}$	$\cancel{5}$	
	$\cancel{2}$	$\cancel{0}$	$\cancel{1}$	$\cancel{6}$	$\cancel{0}$
–	1	1	9	7	5
		8	1	8	5

Example 2: The price of a car is ₹ 186978 and that of a van is ₹ 215647. Which costs more and by how much?

Solution:

The price of a car = ₹ 186978.

The price of a van = ₹ 215647.

Clearly, 215647 > 186978.

∴ The van costs more than the car.

Difference in their prices = ₹ (215647 – 186978)

= ₹ 28669.

∴ The van costs more by ₹ 28669 than the car.

	1	10	14	15	13	17
		$\cancel{0}$	$\cancel{4}$	$\cancel{5}$	$\cancel{3}$	
	$\cancel{2}$	$\cancel{1}$	$\cancel{5}$	$\cancel{6}$	$\cancel{4}$	$\cancel{7}$
–	1	8	6	9	7	8
		2	8	6	6	9

Example 3: The sum of two numbers is 90514. If one of the numbers is 48726, find the other number.

Solution: The sum of two numbers = 90514.

One number = 48726.

∴ The other number = 90514 – 48726

= 41788.

Hence, the other number is 41788.

	8	9	14	10	14
		10	$\cancel{4}$	$\cancel{0}$	
	$\cancel{9}$	$\cancel{0}$	$\cancel{5}$	$\cancel{1}$	$\cancel{4}$
–	4	8	7	2	6
	4	1	7	8	8

Example 4: **The population of a city is 362105. There are 146368 men and 127858 women. The remaining are children. How many children are there in the city?**

Solution:

Number of men in the city = 146368.

Number of women in the city = 127858.

Number of men and women in the city

= 146368 + 127858

= 274226.

		1	1	1	1	
	1	4	6	3	6	8
+	1	2	7	8	5	8
	2	7	4	2	2	6

Now, total population of the city = 362105.

Number of men and women = 274226.

Number of children = 362105 − 274226 = 87879.

Hence, the number of children in the city = 87879.

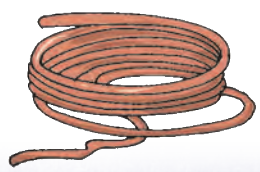
	2	15	11	10	9	15
		~~5~~	~~1~~	~~0~~	~~10~~	
	~~3~~	~~6~~	~~2~~	~~1~~	~~0~~	~~5~~
−	2	7	4	2	2	6
		8	7	8	7	9

Exercise 12

1. There were 48213 bags of rice in a godown. If 19425 bags are taken out, how many bags remain there in the godown?
2. The population of a city is 432105. If the number of males is 298786, find the number of females in the city.

3. In an all India examination, 287300 candidates appeared. Out of these, 97435 failed. How many candidates passed?
4. In the year 2015, a company produced 103410 scooties. Next year, the production was decreased by 19726. How many scooties were produced in the year 2016?

5. The sum of two numbers is 70350. If one of them is 29672, find the other.
6. By how much is 19987 less than 56714?
7. By how much is 90125 more than 58478?
8. The sum of three numbers is 100010. If two of them are 37675 and 28948, find the third number.
9. From a wire 30000 m long, two pieces measuring 8654 m and 9345 m were cut off. Find the length of the remaining wire.



10. A man had ₹ 705000 with him. He gave ₹ 327500 to his son, ₹ 124625 to his wife and the rest to his daughter. How much money was received by the daughter?

11. Kunal had ₹ 841000 with him. He purchased a house for ₹ 572380 and a car for ₹ 186275. How much money was left with him?

12. A milk dairy produced 70500 litres of milk in a day. It supplied 28680 litres to one town and 19596 litres to another town. How much milk was left with the dairy on that day?

Things to Remember

1. When some numbers are added, each number is called an addend. The result obtained after addition is called their sum.

2. The sum of two numbers does not change when the order of addends is changed. This is called the order property of addition of numbers.

3. The sum of three or more numbers does not change when their grouping is changed. This is called the grouping property of addition of numbers.

4. The sum of a number and 0 is equal to the number itself.

5. In a problem on subtraction:

   (a) the larger number is called minuend.

   (b) the number to be subtracted is called subtrahend.

   (c) the result of subtraction is called the difference between the numbers.

6. We cannot change the order of numbers in subtraction.

7. On subtracting 0 from a number, we get the number itself.

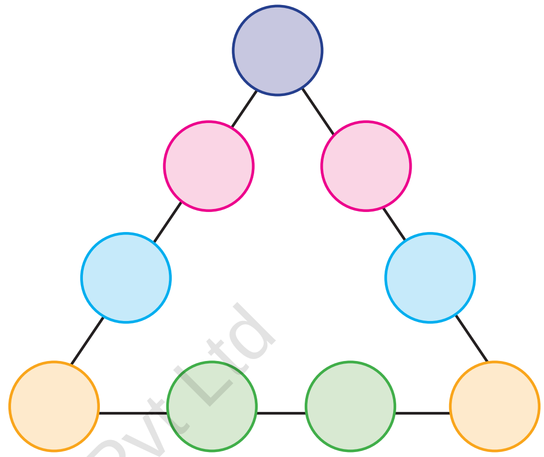
Activity Time

Magic Triangles and Magic Squares

A magic triangle is one in which the sum of numbers along each side is the same.

Activity 1

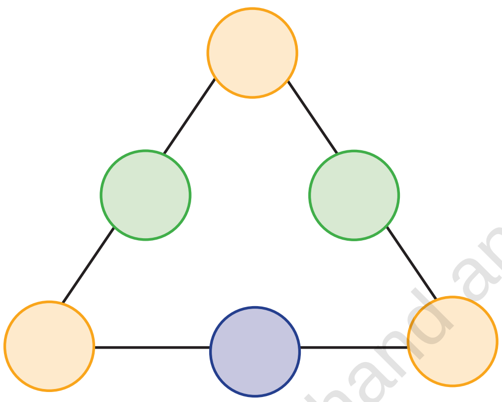
Arrange numbers from 1 to 9 along the sides of the triangle such that the sum of numbers along each side is the same. You have to use each number only once.



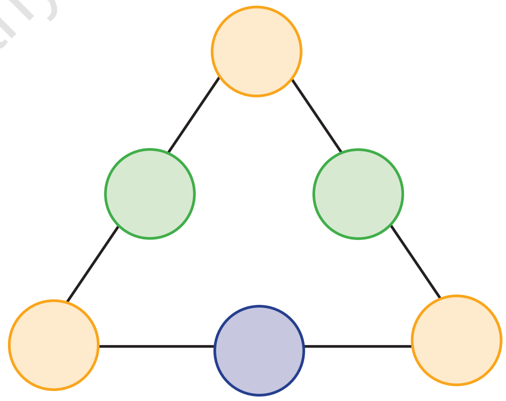
Activity 2

Arrange the numbers from 4 to 9 in the triangle such that the sum of numbers along each side is

(a) 20



(b) 21



A magic square is one in which the sum of numbers in each row, column and diagonal is the same.

Activity 3

Write numbers from 1 to 9 such that each row, column and diagonal add up to the same number.

2	7	
9		
	3	

Activity 4

Use numbers from 1 to 12 to fill the blank spaces. Each row, column and diagonal must add up to 24. You have to use each number only once.

	6	7
	10	

C.C.E. Drill 3

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. 6000 + 6 + 16 = ...

(a) 6616 (b) 6166 (c) 6022 (d) 6202

2. The difference between 3753 and 7000 is

(a) 3247 (b) 3357 (c) 3257 (d) 4247

3. 20000 – 10009 = ...

(a) 10009 (b) 10001 (c) 9991 (d) 10091

4. 82756 – 56987 = ...

(a) 25769 (b) 25869 (c) 26769 (d) 26869

5. 50000 – 1 = ...

(a) 49990 (b) 49999 (c) 40999 (d) 40990

6. 2007 – 207 = 1300 + ...

(a) 1800 (b) 910 (c) 507 (d) 500

7. 21483 – .... = 16483

(a) 5000 (b) 5500 (c) 5050 (d) 5550

8. There are 1864 red clips and 1429 blue clips in a carton. What is the total number of clips in the carton?

(a) 2283 (b) 2293 (c) 3283 (d) 3293

9. Manish has ₹ 2642. He has ₹ 887 more than Keshav. How much money does Keshav have?

(a) ₹ 1755 (b) ₹ 1775 (c) ₹ 3519 (d) ₹ 3529

10. The difference between two numbers is 4937. If the greater number is 30451, what is the smaller number?

(a) 25514 (b) 26514 (c) 35388 (d) 35514

11. What is four hundreds plus fourteen tens?

(a) 414 ☐ (b) 4140 ☐ (c) 441 ☐ (d) 540 ☐

12. 100 more than 99990 equals

(a) 10090 ☐ (b) 100900 ☐ (c) 100090 ☐ (d) 190090 ☐

13. Shop A has 2160 bags of tea. Shop B has 285 bags more than shop A. Shop C has 275 bags less than shop A. Altogether, how many packets of tea do these shops have?

(a) 6470 ☐ (b) 6490 ☐ (c) 5920 ☐ (d) 7040 ☐

14. The value of 91483 + 2639 – 1968 – 6596 is

(a) 85558 ☐ (b) 85658 ☐ (c) 86568 ☐ (d) 85858 ☐

15. Which digit should come in place of each blank space so that the addition is correct?

		8	5	8	9
+		6	☐	☐	6
	1	5	3	6	5

(a) 6 ☐ (b) 7 ☐

(c) 8 ☐ (d) 9 ☐

16. Which digit should come in place of ☐, so that the given subtraction is correct?

	9	7	6	8
–		2	☐	9
	9	4	8	9

(a) 3 ☐ (b) 4 ☐

(c) 7 ☐ (d) 8 ☐

QUESTION BAG 2

1. Compare and put the correct symbol >, < or = in the boxes.

(a) 15515 – 1015 ☐ 13000 + 1500

(b) 2987 + 356 ☐ 4021 – 687

(c) 7000 + 70 + 27 ☐ 8000 – 921

(d) 5470 + 50 + 500 ☐ 6500 – 450

(e) 6839 + 100 + 100 ☐ 7189 – 150

2. Fill in the missing numbers.

(a) 20 – 7 = 6 + $\boxed{}$

(b) 85 – 25 = 45 + $\boxed{}$

(c) 65 + 35 = $\boxed{}$ – 25

(d) 85 – 7 = 60 + $\boxed{}$

3. Find the number which is:

(a) 800 more than 16850

(b) 600 less than 11527

4. What must be added to 48461 to get 60150?

5. What must be subtracted from 50000 to get 28364?

6. Which number exceeds 48665 by 888?

7. How much is 1 lakh more than 60666?

8. Add the largest 5-digit number to the largest 6-digit number.

9. Fill in the blanks.

(a) Sheela's father was 57 years old in 2012. He was born in.................... .

(b) 1 lakh – 100 hundreds = ...

(c) In the problem 46793 – 34168 = 12625, the subtrahend is .... and the minuend is ....

(d) In the problem 8258 + 3675 = 11933, 8258 and 3675 are the .... and 11933 is the ....

(e) 80 hundreds + 60 tens = ...

(f) 5 thousands + 56 hundreds = ...

(g) If a hospital was founded in 1914 it would celebrate its centenary in ....

(h) Largest 6-digit number + 1 = ...

(i) When minuend = subtrahend, difference is ....

10. Fill in the missing numbers.

(a) 60500 – 1= $\boxed{}$

(b) 8500 + 270 + 8 = $\boxed{}$

(c) 50000 + 267 + $\boxed{}$ = 81267

(d) 7200 – $\boxed{}$ = 6500

(e) 2350 + $\boxed{}$ = 3000

(f) 9999 + $\boxed{}$ = 20000

(g) 21867 – $\boxed{}$ = 5000

(h) $\boxed{}$ – 6234 = 15000

11. Fill in the missing numbers.

(a) 63478 + $\square$ = 65000

(b) 6515 − $\square$ = 6015

(c) 8484 − $\square$ = 8470

(d) 8789 + $\square$ = 8800

(e) 61871 + 500 = $\square$

(f) 8996 − $\square$ = 8936

12. Supply the missing digits.

(a)

	4	9	$\square$	7	8
+	3	$\square$	5	$\square$	9
	$\square$	2	1	8	$\square$

(b)

	2	$\square$	7	3	$\square$
+	4	1	$\square$	7	4
	$\square$	8	0	$\square$	6

13. Fill in the missing digits.

(a)

	6	$\square$	4	6
−	$\square$	2	$\square$	7
	2	1	5	$\square$

(b)

	3	$\square$	5	$\square$	7
−		2	$\square$	8	9
	3	2	4	7	$\square$

14. State whether each of the following statements is true or false.

(a) The sum is always greater than each of the addends. ....

(b) Minuend is always less than the subtrahend. ....

(c) We can change the order of addends. ....

(d) We can change the order of minuend and subtrahend. ....

(e) The sum of a number and 1 is the number itself. ....

15. The difference between two numbers is 35489. If the greater of the two numbers is 73325, find the sum of the two numbers.

16. A public library has 36897 books on Science, 4769 books on Mathematics and 14575 books on other subjects. How many books are there in the library?

17. Gaurav wants to buy a car that costs ₹ 304652. He has only ₹ 188760. How much more money does he need?

18. There are 4562 boys in a school. The number of girls is 689 less than the number of boys. Find the total strength of the school.

5 Multiplication and Division

Multiplication

In Class 3, we have learnt how to multiply a given number by a number consisting of two or less digits. We have also studied the various properties of multiplication.

In a multiplication sum:

The number to be multiplied is called the Multiplicand.

The number by which we multiply is called the Multiplier.

And, the result of multiplication is called the Product.

Example: In 123 × 4 = 492, we have:
multiplicand = 123, multiplier = 4 and product = 492.

Properties of Multiplication

I. Order Property of Multiplication

Example 1: Find the products: 36 × 23 and 23 × 36.
What do you conclude?

Solution: We have:

$$\begin{array}{rrrr} & & 3 & 6 \\ & \times & 2 & 3 \\ \hline & 1 & 0 & 8 \\ + & 7 & 2 & 0 \\ \hline & 8 & 2 & 8 \\ \hline \end{array} \qquad \begin{array}{rrrr} & & 2 & 3 \\ & \times & 3 & 6 \\ \hline & 1 & 3 & 8 \\ + & 6 & 9 & 0 \\ \hline & 8 & 2 & 8 \\ \hline \end{array}$$

Conclusion: We have, 36 × 23 = 23 × 36.

We may take the products of other numbers, taken in pairs. We shall find in each case that by changing the order of numbers, the product is not changed.
This result is true for large numbers also. Thus,

The product of two numbers does not change, when the order of numbers is changed. This property is known as Order Property of Multiplication.

II. Grouping Property of Multiplication

Example 2: Find the products: $(10 \times 7) \times 5$ and $10 \times (7 \times 5)$.

What do you conclude?

Solution: We have:

$(10 \times 7) \times 5 = 70 \times 5 = 350.$

$10 \times (7 \times 5) = 10 \times 35 = 350.$

Conclusion: $(10 \times 7) \times 5 = 10 \times (7 \times 5).$

Thus, we find that on changing the grouping, the product is not changed. We shall find that this is true for large numbers also. Thus,

The product of three numbers does not change, when the grouping of numbers is changed. This property is known as Grouping Property of Multiplication.

III. Multiplicative Property of 1

Example 3: Find the products 23×1, 146×1 and 1435×1.

What do you conclude?

Solution: We have:

$$\begin{array}{r} 23 \\ \times \quad 1 \\ \hline 23 \\ \hline \end{array} \qquad \begin{array}{r} 146 \\ \times \quad 1 \\ \hline 146 \\ \hline \end{array} \qquad \begin{array}{r} 1435 \\ \times \quad 1 \\ \hline 1435 \\ \hline \end{array}$$

Thus, $23 \times 1 = 23$, $146 \times 1 = 146$ and $1435 \times 1 = 1435$.

Conclusion: A number $\times$ 1 = The number itself.

Thus, the product of a number by 1 is the number itself. This is called the Multiplicative Property of 1.

IV. Multiplicative Property of Zero

Example 4: Find the products 48×0, 219×0 and 7654×0.

What do you conclude?

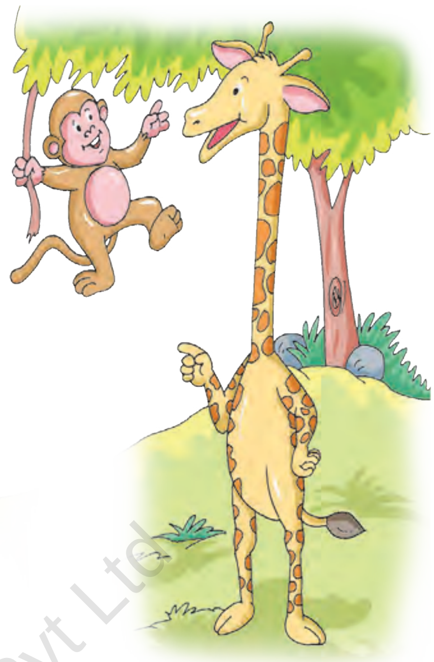
Solution: We have:

$48 \times 0 = 0$, $219 \times 0 = 0$ and $7654 \times 0 = 0$.

Conclusion: (Any number) $\times 0 = 0$.

Thus, the product of a number by 0 is 0. This is called the Multiplicative Property of Zero.

V. Distributive Property of Multiplication Over Addition



Example 5: Find the results: $4 \times (6 + 7)$ and $(4 \times 6) + (4 \times 7)$. What do you conclude?

Solution: We have:

$4 \times (6 + 7) = 4 \times 13 = 52.$

$(4 \times 6) + (4 \times 7) = 24 + 28 = 52.$

Conclusion: $4 \times (6 + 7) = (4 \times 6) + (4 \times 7).$

In a similar manner, we can say that we shall have:

$14 \times (25 + 16) = (14 \times 25) + (14 \times 16);$

$70 \times (72 + 28) = (70 \times 72) + (70 \times 28);$

$346 \times (81 + 95) = (346 \times 81) + (346 \times 95)$ etc.

This result is true for large numbers also.

This property is known as Distributive Property of Multiplication over Addition.

This property will be used as a tool for multiplying large numbers.

Multiplication of a Number by 10, 100, 1000 etc.

Rule 1: To multiply a given number by 10, insert one zero on the right of the given number.

Thus, we have:

$25 \times 10 = 250$, $147 \times 10 = 1470$, $2386 \times 10 = 23860$, etc.

Rule 2: To multiply a given number by 100, insert two zeros on the right of the given number.

Thus, we have:

$79 \times 100 = 7900$, $465 \times 100 = 46500$, $2784 \times 100 = 278400$, etc.

Rule 3: To multiply a given number by 1000, insert three zeros on the right of the given number.

Thus, we have:

$54 \times 1000 = 54000$, $357 \times 1000 = 357000$, $4853 \times 1000 = 4853000$, etc.

Multiplication of a Number by a Multiple of 10, 100, 1000 etc.

The following examples will make the ideas clear.

Example 6: Find the products:

(a) 289×20 (b) 478×40 (c) 1246×90

Solution: We have:

(a) $289 \times 20 = 289 \times 2 \times 10$

$= (289 \times 2) \times 10$

$= 578 \times 10 = 5780.$

(b) $478 \times 40 = 478 \times 4 \times 10$

$= (478 \times 4) \times 10$

$= 1912 \times 10 = 19120.$

(c) $1246 \times 90 = 1246 \times 9 \times 10$

$= 11214 \times 10 = 112140.$

Example 7: Find the products:

(a) 86×300 (b) 324×500 (c) 1206×700

Solution: We have:

(a) $86 \times 300 = 86 \times 3 \times 100$

$= (86 \times 3) \times 100$

$= 258 \times 100 = 25800.$

(b) $324 \times 500 = 324 \times 5 \times 100$

$= (324 \times 5) \times 100$

$= 1620 \times 100 = 162000.$

(c) $1206 \times 700 = 1206 \times 7 \times 100$

$= (1206 \times 7) \times 100$

$= 8442 \times 100 = 844200.$

Example 8: Find the products:

(a) 97×4000 (b) 106×6000 (c) 2316×8000

Solution: We have:

(a) $97 \times 4000 = 97 \times 4 \times 1000$

$= (97 \times 4) \times 1000$

$= 388 \times 1000 = 388000.$

(b) $106 \times 6000 = 106 \times 6 \times 1000$

$= (106 \times 6) \times 1000$

$= 636 \times 1000 = 636000.$

(c) $2316 \times 8000 = 2316 \times 8 \times 1000$

$= (2316 \times 8) \times 1000$

$= 18528 \times 1000 = 18528000.$

Thus, we have the following rules:

Rule 1: In order to multiply a number by 20, 30, 40, ..., 90, we multiply the number by 2, 3, 4, ..., 9 respectively and insert one zero on the right of the product.

Rule 2: In order to multiply a number by 200, 300, 400, ..., 900, we multiply the number by 2, 3, 4, ..., 9 respectively and insert two zeros on the right of the product.

Rule 3: In order to multiply a number by 2000, 3000, 4000, ..., 9000, we multiply the number by 2, 3, 4, ..., 9 respectively and insert three zeros on the right of the product, and so on.

Example 9: Using suitable grouping, find the following products:

(a) $2 \times 49 \times 5$ (b) $5 \times 85 \times 20$ (c) $4 \times 76 \times 25$

Solution: We have:

(a) $2 \times 49 \times 5 = (2 \times 5) \times 49$

$= 10 \times 49 = 490.$

(b) $5 \times 85 \times 20 = (5 \times 20) \times 85$

$= 100 \times 85 = 8500.$

(c) $4 \times 76 \times 25 = (4 \times 25) \times 76$

$= 100 \times 76 = 7600.$

Exercise 13

1. **Fill in the blanks.**
   (a) $158 \times$ ...... $= 158$ (b) ...... $\times 1 = 264$ (c) $2536 \times$ ...... $= 0$
   (d) $372 \times$ ...... $= 0$ (e) $1 \times$ ...... $= 809$ (f) $9783 \times$ ...... $= 0$

2. **Fill in the blanks.**
   (a) $97 \times 106 = 106 \times$ ...... (b) $537 \times 243 =$ ...... $\times 537$
   (c) $1309 \times 640 =$ ...... $\times 1309$ (d) $361 \times$ ...... $= 637 \times 361$

3. **Fill in the blanks.**
   (a) $(85 \times 76) \times 99 = 85 \times$ (.......... $\times 99$)
   (b) $138 \times (431 \times 644) =$ (.......... $\times 431) \times 644$
   (c) $42 \times (83 \times 68) = 42 \times (68 \times$ ....)

4. **Fill in the blanks.**
   (a) $84 \times (57 + 36) = (84 \times 57) + (84 \times$ ....)
   (b) $103 \times (81 + 59) = (103 \times$ ....) $+ (103 \times 59)$
   (c) $92 \times$ (.......... $+ 36) = (92 \times 47) + (92 \times 36)$
   (d) $127 \times (75 +$ ......) $= (127 \times 75) + (127 \times 53)$

5. Fill the blanks.

(a) $247 \times 10 = \boxed{}$ (b) $1056 \times 10 = \boxed{}$ (c) $3978 \times 10 = \boxed{}$

(d) $93 \times 100 = \boxed{}$ (e) $576 \times 100 = \boxed{}$ (f) $2917 \times 100 = \boxed{}$

(g) $68 \times 1000 = \boxed{}$ (h) $231 \times 1000 = \boxed{}$ (i) $1508 \times 1000 = \boxed{}$

Find the following products.

6. 95×30 **7.** 178×50 **8.** 109×70

9. 1225×20 **10.** 77×200 **11.** 163×400

12. 819×500 **13.** 2103×700 **14.** 1526×600

15. 89×2000 **16.** 127×3000 **17.** 914×4000

18. 627×5000

By using suitable grouping, find the following products.

19. $2 \times 36 \times 5$ **20.** $5 \times 79 \times 20$ **21.** $4 \times 68 \times 25$

22. $2 \times 47 \times 50$ **23.** $36 \times 4 \times 125$ **24.** $2 \times 107 \times 500$

Multiplication of 3- and 4-digit Numbers

Let us learn the method of multiplying 3-digit and 4-digit numbers by 2-digit and 3-digit numbers.

Example 1: Multiply 248 by 36.

Solution: We may write, $36 = 30 + 6$.

$\therefore\ 248 \times 36 = 248 \times (30 + 6)$

$= 248 \times 30 + 248 \times 6$

$= 7440 + 1488$

$= 8928.$

Short Method:

$$\begin{array}{rrrrrl}
 & & 2 & 4 & 8 & \\
\times & & & 3 & 6 & \\
\hline
 & 1 & 4 & 8 & 8 & \leftarrow (248 \times 6) \\
+ & 7 & 4 & 4 & 0 & \leftarrow (248 \times 30) \\
\hline
 & 8 & 9 & 2 & 8 & \leftarrow (248 \times 36) \\
\hline
\end{array}$$

$\therefore\ 248 \times 36 = 8928.$

Example 2: **Multiply 376 by 147.**

Solution: We have, 147 = 100 + 40 + 7.

$\therefore$ 376 × 147 = 376 × (100 + 40 + 7)

= 376 × 100 + 376 × 40 + 376 × 7

= 37600 + 15040 + 2632

= 55272.

Short Method:

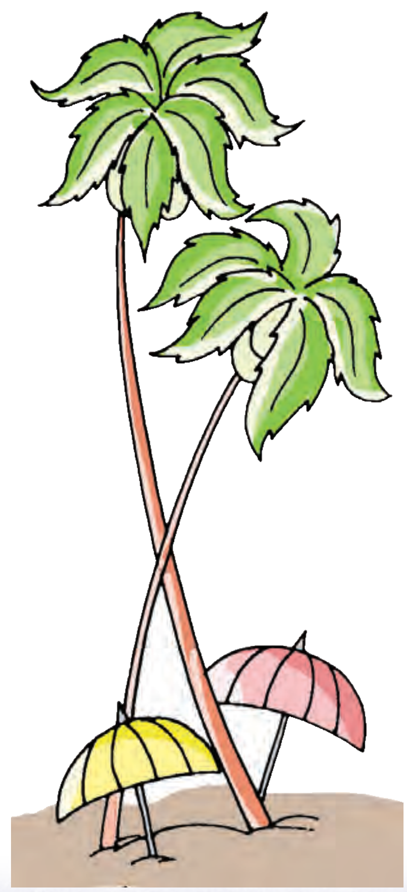
$$\begin{array}{rrrrrl}
 & & 3 & 7 & 6 & \\
 & \times & 1 & 4 & 7 & \\
\hline
 & 2 & 6 & 3 & 2 & \leftarrow (376 \times 7) \\
1 & 5 & 0 & 4 & 0 & \leftarrow (376 \times 40) \\
+\,3 & 7 & 6 & 0 & 0 & \leftarrow (376 \times 100) \\
\hline
5 & 5 & 2 & 7 & 2 & \leftarrow (376 \times 147) \\
\hline
\end{array}$$

$\therefore$ 376 × 147 = 55272.

Example 3: **Multiply 2317 by 379.**

Solution: We have, 379 = 300 + 70 + 9.

So, by short method, we multiply as under:



$$\begin{array}{rrrrrrl}
 & & 2 & 3 & 1 & 7 & \\
 & \times & & 3 & 7 & 9 & \\
\hline
 & 2 & 0 & 8 & 5 & 3 & \leftarrow (2317 \times 9) \\
1 & 6 & 2 & 1 & 9 & 0 & \leftarrow (2317 \times 70) \\
+\,6 & 9 & 5 & 1 & 0 & 0 & \leftarrow (2317 \times 300) \\
\hline
8 & 7 & 8 & 1 & 4 & 3 & \leftarrow (2317 \times 379) \\
\hline
\end{array}$$

$\therefore$ 2317 × 379 = 878143.

Example 4: **Multiply 1284 by 607.**

Solution: We may write:

607 = 6 hundreds + 0 tens + 7 ones.

So, we multiply as under.

$$
\begin{array}{rrrrrrl}
 & & 1 & 2 & 8 & 4 & \\
 & \times & & 6 & 0 & 7 & \\
\hline
 & & 8 & 9 & 8 & 8 & \leftarrow (1284 \times 7 \text{ ones}) \\
 & 0 & 0 & 0 & 0 & 0 & \leftarrow (1284 \times 0 \text{ tens}) \\
+\,7 & 7 & 0 & 4 & 0 & 0 & \leftarrow (1284 \times 6 \text{ hundreds}) \\
\hline
7 & 7 & 9 & 3 & 8 & 8 & \leftarrow (1284 \times 607) \\
\hline
\end{array}
$$

$\therefore$ 1284 × 607 = 779388.

Short Method:

We have, 607 = 600 + 7.

So, we multiply as shown on the right.

$$
\begin{array}{rrrrrrl}
 & & 1 & 2 & 8 & 4 & \\
 & \times & & 6 & 0 & 7 & \\
\hline
 & & 8 & 9 & 8 & 8 & \leftarrow (1284 \times 7) \\
+\,7 & 7 & 0 & 4 & 0 & 0 & \leftarrow (1284 \times 600) \\
\hline
7 & 7 & 9 & 3 & 8 & 8 & \leftarrow (1284 \times 607) \\
\hline
\end{array}
$$

$\therefore$ 1284 × 607 = 779388.

Example 5: Multiply 1349 by 480.

Solution: We may write:

480 = 4 hundreds + 8 tens + 0 ones.

So, we multiply as shown on the right.

$$
\begin{array}{rrrrrrl}
 & & 1 & 3 & 4 & 9 & \\
 & \times & & 4 & 8 & 0 & \\
\hline
 & & 0 & 0 & 0 & 0 & \leftarrow (1349 \times 0 \text{ ones}) \\
 & 1 & 0 & 7 & 9 & 2 & 0 \leftarrow (1349 \times 8 \text{ tens}) \\
+\,5 & 3 & 9 & 6 & 0 & 0 & \leftarrow (1349 \times 4 \text{ hundreds}) \\
\hline
6 & 4 & 7 & 5 & 2 & 0 & \leftarrow (1349 \times 480) \\
\hline
\end{array}
$$

$\therefore$ 1349 × 480 = 647520.

Short Method:

We have, 480 = 400 + 80.

So, we multiply as shown on the right.

$$
\begin{array}{rrrrrrl}
 & & 1 & 3 & 4 & 9 & \\
 & \times & & 4 & 8 & 0 & \\
\hline
1 & 0 & 7 & 9 & 2 & 0 & \leftarrow (1349 \times 80) \\
+\,5 & 3 & 9 & 6 & 0 & 0 & \leftarrow (1349 \times 400) \\
\hline
6 & 4 & 7 & 5 & 2 & 0 & \leftarrow (1349 \times 480) \\
\hline
\end{array}
$$

$\therefore$ 1349 × 480 = 647520.

Exercise 14

Find the following products.

1.
$$\begin{array}{r} 4\ 2\ 6 \\ \times\quad 8\ 7 \\ \hline \\ \hline \\ \hline \end{array}$$

2.
$$\begin{array}{r} 2\ 0\ 1\ 5 \\ \times\qquad 9\ 3 \\ \hline \\ \hline \\ \hline \end{array}$$

3.
$$\begin{array}{r} 3\ 7\ 6\ 8 \\ \times\qquad 5\ 4 \\ \hline \\ \hline \\ \hline \end{array}$$

4.
$$\begin{array}{r} 2\ 4\ 3 \\ \times\ 1\ 2\ 5 \\ \hline \\ \hline \\ \hline \end{array}$$

5.
$$\begin{array}{r} 6\ 4\ 5 \\ \times\ 1\ 6\ 7 \\ \hline \\ \hline \\ \hline \end{array}$$

6.
$$\begin{array}{r} 8\ 1\ 9 \\ \times\ 2\ 5\ 8 \\ \hline \\ \hline \\ \hline \end{array}$$

7.
$$\begin{array}{r} 1\ 3\ 6\ 8 \\ \times\quad 2\ 1\ 9 \\ \hline \\ \hline \\ \hline \end{array}$$

8.
$$\begin{array}{r} 9\ 3\ 6 \\ \times\ 5\ 2\ 3 \\ \hline \\ \hline \\ \hline \end{array}$$

9.
$$\begin{array}{r} 1\ 8\ 5\ 9 \\ \times\quad 3\ 7\ 6 \\ \hline \\ \hline \\ \hline \end{array}$$

Multiply:

10. 654 by 827

11. 713 by 965

12. 1895 by 362

13. 1423 by 914

14. 2106 by 716

15. 2317 by 498

16. 1235 by 408

17. 2018 by 609

18. 1914 by 703

19. 2879 by 306

20. 657 by 450

21. 1023 by 570

22. **Fill in the boxes.**

(a)
$$\begin{array}{rccccc} & & & 4 & 5 & 8 \\ & & \times & & 7 & \square \\ \hline & & \square & \square & \square & \square \\ + & \square & \square & \square & \square & 0 \\ \hline & 3 & \square & \square & \square & 8 \\ \hline \end{array}$$

(b)
$$\begin{array}{rccccc} & & & 8 & 3 & 6 \\ & & \times & & \square & \square \\ \hline & & \square & \square & \square & \square \\ + & \square & \square & \square & \square & 0 \\ \hline & 3 & \square & \square & \square & 6 \\ \hline \end{array}$$

Word Problems on Multiplication

Example 1: There are 275 clips in a packet. How many clips are there in 173 such packets?

Solution: Number of clips in 1 packet = 275.

Number of clips in 173 packets = 275 × 173.

$$\begin{array}{r} 2\;7\;5 \\ \times\;1\;7\;3 \\ \hline 8\;2\;5 \\ 1\;9\;2\;5\;0 \\ +\;2\;7\;5\;0\;0 \\ \hline 4\;7\;5\;7\;5 \\ \hline \end{array}$$

Hence, there are 47575 clips in 173 packets.

Example 2: A bicycle costs ₹ 1226. How much will 328 bicycles cost?

Solution: Cost of 1 bicycle = ₹ 1226.

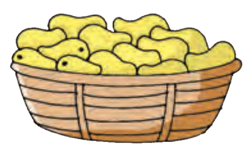
Cost of 328 bicycles = ₹ (1226 × 328)

$$\begin{array}{r} 1\;2\;2\;6 \\ \times\;3\;2\;8 \\ \hline 9\;8\;0\;8 \\ 2\;4\;5\;2\;0 \\ +\;3\;6\;7\;8\;0\;0 \\ \hline 4\;0\;2\;1\;2\;8 \\ \hline \end{array}$$

Hence, the cost of 328 bicycles is ₹ 402128.

Exercise 15

1. In an orchard there are 98 rows of mango trees. How many trees are there in the orchard, if each row has 87 trees?
2. A box contains 124 oranges. How many oranges are there in 139 such boxes?



3. A basket contains 187 mangoes. How many mangoes are there in 207 such baskets?
4. There are 576 buttons in a packet. Find the number of buttons in 249 such packets.
5. One ream of paper contains 480 sheets. How many sheets of paper are there in 375 reams?

6. An almirah can hold 328 books. How many books can be kept in 240 such almirahs?
7. The cost of a chair is ₹ 697. How much will 369 chairs cost?

8. The cost of a refrigerator is ₹ 7564. Find the cost of 108 refrigerators.
9. How much money was collected from 1783 students of a school for a charity show, if each student contributes ₹ 405?
10. There are four sections in Class 4 of a school. Each section consists of 47 students. If the monthly fee of each student is ₹ 583, find the total amount of fee collected from the whole Class in a month.
11. 349 sheets are required to print a book. How many sheets will be required to print 2856 books?

Division

We have already learnt that division is the inverse process of multiplication.

Every multiplication fact gives rise to two division facts.

Thus, for $5 \times 6 = 30$, we have:

$30 \div 5 = 6$ and $30 \div 6 = 5$.

Also, we have carried out division by repeated subtraction and solved problems on equal sharing or distribution using the concept of division.

In Class 3, we learnt how to divide a number consisting of 3 or less digits by a 1-digit number. In this chapter, we shall learn the division of a 4-digit number or a larger number by a 2-digit number. The method remains the same.

In a division sum:

The number to be divided is called the dividend.

The number by which division is made is called the divisor.

The number of times the divisor is contained in the dividend is called the quotient.

After subtracting the product of divisor and quotient from the dividend, we get the remainder.

Example: When we divide 125 by 8, we have:

dividend = 125, divisor = 8,

quotient = 15 and remainder = 5.

$$\begin{array}{r} 15 \\ 8\overline{)125} \\ -8 \\ \hline 45 \\ -40 \\ \hline 5 \\ \hline \end{array}$$

An Important Result:

In a division sum, we always have:

Dividend = (Divisor × Quotient) + Remainder.

Properties of Division

1. On dividing a non-zero number by 1, the quotient is the number itself.

Thus, $86 \div 1 = 86$, $619 \div 1 = 619$, $2537 \div 1 = 2537$, etc.

2. On dividing a non-zero number by itself, the quotient obtained is 1.

Thus, $67 \div 67 = 1$, $809 \div 809 = 1$, $3356 \div 3356 = 1$, etc.

3. Division by zero has no meaning.

4. On dividing 0 by a non-zero number, the quotient obtained is 0.

Thus, $0 \div 89 = 0$, $0 \div 617 = 0$, etc.

Let us recall the method of division by taking an example of dividing a 4-digit number by a 1-digit number. Using the same ideas, we proceed to the division of a larger number by a 2-digit number.

Example 1: Divide 2468 by 7 and check your answer.

Solution: We first perform the division by the method with which we are already familiar. Then, we explain the method in detail.

	Th	H	T	O	
		3	5	2	
7)	2	4	6	8	
	− 2	1	↓	↓	← Dividing hundreds
		3	6		
		− 3	5		← Dividing tens
			1	8	
			− 1	4	← Dividing ones
				4	

Explanation:

Step 1: We begin from the left, i.e., with the thousands.

Since 2 < 7, we cannot divide 2 by 7.

Take the digits in thousands and hundreds places together.

Now, 2 thousands and 4 hundreds make 24 hundreds.

Step 2: Divide 24 hundreds by 7.

Clearly, $7 \times 3 = 21$ and $7 \times 4 = 28$.

And, $21 < 24$ while $28 > 24$.

Thus, 7 goes into 24, three times.

Write 3 at the hundreds place in the quotient.

Subtract 21 from 24 to get 3.

Bring down 6 tens.

Now, 3 hundreds and 6 tens make 36 tens.

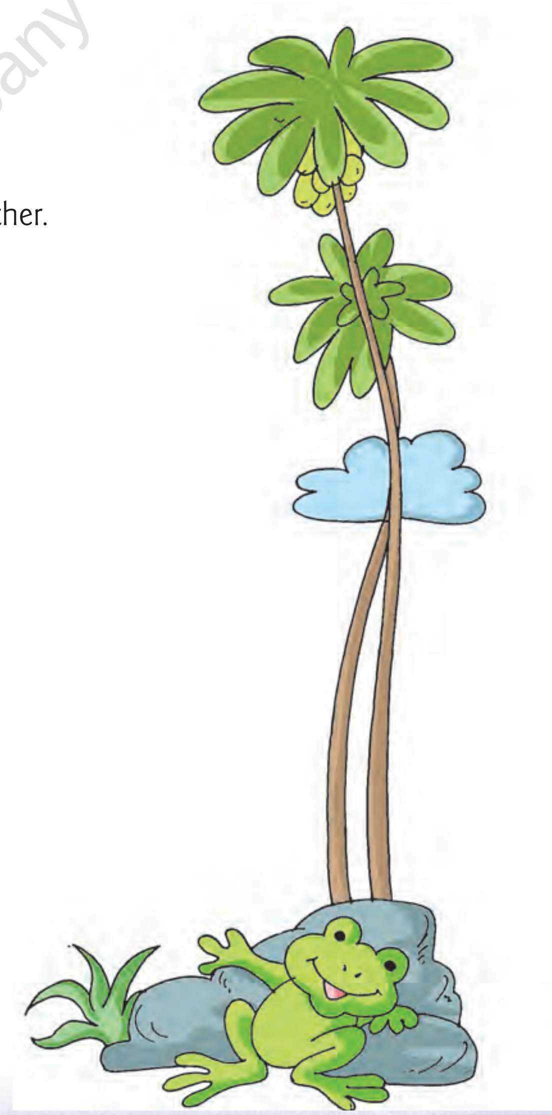
Step 3: Divide 36 tens by 7.

Clearly, $7 \times 5 = 35$ and $7 \times 6 = 42$.

And, $35 < 36$ while $42 > 36$.

Thus, 7 goes into 36, five times.

Write 5 at the tens place in the quotient.



Subtract 35 from 36 to get 1.

Bring down 8 ones.

Now, 1 ten and 8 ones make 18 ones.

Step 4: Divide 18 ones by 7.

Clearly, $7 \times 2 = 14$ and $7 \times 3 = 21$.

And, $14 < 18$ while $21 > 18$.

Thus, 7 goes into 18, two times.

Write 2 at the ones place in the quotient.

Subtract 14 from 18 to get 4.

$\therefore$ Remainder = 4.

Thus, on dividing 2468 by 7, we get:

Quotient = 352 and remainder = 4.

Check: We have:

(Divisor × Quotient) + Remainder

$= (7 \times 352) + 4$

$= 2464 + 4 = 2468$ = Dividend.

Therefore, our answer is correct.

$$\begin{array}{rrrrl} & 3 & 5 & 2 & \leftarrow \text{Quotient} \\ & & \times & 7 & \leftarrow \text{Divisor} \\ \hline 2 & 4 & 6 & 4 & \\ & & + & 4 & \leftarrow \text{Remainder} \\ \hline 2 & 4 & 6 & 8 & \leftarrow \text{Dividend} \\ \hline \end{array}$$

Division by a 2-digit Number

Example 2: Divide 6259 by 17 and check the answer.

Solution:

Explanation:

Step 1: Since the divisor is a 2-digit number, we begin with the number formed by the first two leftmost digits of the dividend.

This number is $62 > 17$.

Now, $17 \times 3 = 51$ and $17 \times 4 = 68$.

And, $51 < 62$ while $68 > 62$.

Thus, 17 goes into 62, three times.

Write 3 just above 2 in the quotient.

Subtract 51 from 62 to get 11.

Bring down 5 to make 115.

$$\begin{array}{r|rrrr} & & 3 & 6 & 8 \\ \cline{2-5} 17 & 6 & 2 & 5 & 9 \\ & -5 & 1 & \downarrow & \\ \cline{2-5} & 1 & 1 & 5 & \\ & -1 & 0 & 2 & \downarrow \\ \cline{2-5} & & 1 & 3 & 9 \\ & & -1 & 3 & 6 \\ \cline{3-5} & & & & 3 \\ \cline{3-5} \end{array}$$

Step 2: Now, $17 \times 6 = 102$ and $17 \times 7 = 119$.

And, $102 < 115$ while $119 > 115$.

Thus, 17 goes into 115, six times.

Write 6 next to 3 in the quotient.

Subtract 102 from 115 to get 13.

Bring down 9 to make 139.

Step 3: Now, $17 \times 8 = 136$ and $17 \times 9 = 153$.

And, $136 < 139$ while $153 > 139$.

Thus, 17 goes into 139, eight times.

Write 8 next to 6 in the quotient.

Subtract 136 from 139 to get 3.

$\therefore$ Remainder = 3.

Thus, when 6259 is divided by 17, we get:

Quotient = 368, Remainder = 3.

Check: We have:

(Divisor × Quotient) + Remainder

$= (17 \times 368) + 3$

$= 6256 + 3$

$= 6259$

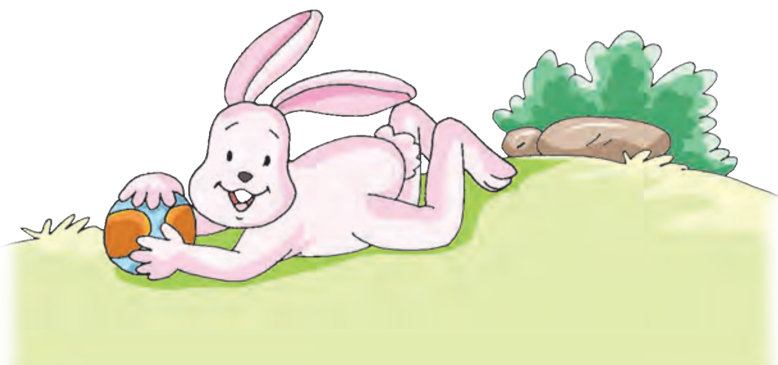
Hence, our answer is correct.

$$\begin{array}{rrrrl} & 3 & 6 & 8 & \leftarrow \text{Quotient} \\ & \times & 1 & 7 & \leftarrow \text{Divisor} \\ \hline 2 & 5 & 7 & 6 & \\ +\,3 & 6 & 8 & 0 & \\ \hline 6 & 2 & 5 & 6 & \\ & & + & 3 & \leftarrow \text{Remainder} \\ \hline 6 & 2 & 5 & 9 & \leftarrow \text{Dividend} \\ \hline \end{array}$$

Example 3: Divide 7708 by 29 and check the answer.

Solution:

$$\begin{array}{r|rrrr} & & 2 & 6 & 5 \\ \hline 29 & 7 & 7 & 0 & 8 \\ & -5 & 8 & & \\ \hline & 1 & 9 & 0 & \\ & -1 & 7 & 4 & \\ \hline & & 1 & 6 & 8 \\ & & -1 & 4 & 5 \\ \hline & & & 2 & 3 \\ \hline \end{array}$$



$\therefore$ Quotient = 265, Remainder = 23.

Check: We have:

(Divisor × Quotient) + Remainder

= (29 × 265) + 23

= 7685 + 23

= 7708

= Dividend.

∴ Our answer is correct.

$$\begin{array}{rrrrl}
 & 2 & 6 & 5 & \leftarrow \text{Quotient} \\
 & \times & 2 & 9 & \leftarrow \text{Divisor} \\
\hline
2 & 3 & 8 & 5 & \\
+5 & 3 & 0 & 0 & \\
\hline
7 & 6 & 8 & 5 & \\
 & + & 2 & 3 & \leftarrow \text{Remainder} \\
\hline
7 & 7 & 0 & 8 & \leftarrow \text{Dividend} \\
\hline
\end{array}$$

Example 4: Divide 20563 by 99 and check the answer.

Solution:

$$\begin{array}{r|l}
 & 207 \\
\hline
99 & 20563 \\
 & -198 \\
\hline
 & 763 \\
 & -693 \\
\hline
 & 70 \\
\hline
\end{array}$$

∴ Quotient = 207, Remainder = 70.

Check: We have:

(Divisor × Quotient) + Remainder

= (99 × 207) + 70

= 20493 + 70

= 20563

= Dividend.

∴ Our answer is correct.

$$\begin{array}{rrrrrl}
 & & 2 & 0 & 7 & \leftarrow \text{Quotient} \\
 & & \times & 9 & 9 & \leftarrow \text{Divisor} \\
\hline
 & 1 & 8 & 6 & 3 & \\
+1 & 8 & 6 & 3 & 0 & \\
\hline
2 & 0 & 4 & 9 & 3 & \\
 & & + & 7 & 0 & \leftarrow \text{Remainder} \\
\hline
2 & 0 & 5 & 6 & 3 & \leftarrow \text{Dividend} \\
\hline
\end{array}$$

Exercise 16

Find the quotient and remainder when you divide. Also, check your answer in each question.

1. 5479 by 12
2. 5943 by 19
3. 8829 by 18
4. 8938 by 25
5. 9546 by 38
6. 7608 by 41
7. 8000 by 39
8. 8125 by 37
9. 9871 by 29

10. 9025 by 85 **11.** 9400 by 92 **12.** 9983 by 83

13. 10000 by 74 **14.** 22800 by 56 **15.** 31760 by 98

16. 72500 by 72 **17.** 90047 by 82 **18.** 87025 by 29

19. Find the quotient when dividend = 5940 and divisor = 54.

20. Find the divisor when dividend = 7560 and quotient = 63.

21. Find the dividend, when quotient = 56, divisor = 65 and remainder = 50.

22. Find the dividend, when quotient = 209, divisor = 43 and remainder = 23.

Division by 10, 100 and 1000

Dividing a Number by 10

Example 1: Divide each of the following numbers by 10.

(a) 253 (b) 1724 (c) 2008

What do you observe?

Solution:

(a)

$$\begin{array}{r|l} & 25 \\ \cline{2-2} 10 & 253 \\ & -20 \\ \cline{2-2} & 53 \\ & -50 \\ \cline{2-2} & 3 \\ \cline{2-2} \end{array}$$

Quotient = 25, Remainder = 3.

(b)

$$\begin{array}{r|l} & 172 \\ \cline{2-2} 10 & 1724 \\ & -10 \\ \cline{2-2} & 72 \\ & -70 \\ \cline{2-2} & 24 \\ & -20 \\ \cline{2-2} & 4 \\ \cline{2-2} \end{array}$$

Quotient = 172, Remainder = 4.

(c)

$$\begin{array}{r|l} & 200 \\ \cline{2-2} 10 & 2008 \\ & -20 \\ \cline{2-2} & 008 \\ \cline{2-2} \end{array}$$

$\therefore$ Quotient = 200, Remainder = 8.

From the above examples, the following rule is quite clear.

Rule 1: On dividing a number by 10, the quotient is obtained by removing the ones digit from the number and the remainder is the ones digit of the number.

Thus, in a division sum with divisor 10, we may adopt the above rule.

Example 2: Using the rule of division by 10, find the quotient and the remainder when each of the following numbers is divided by 10:

(a) 1997 (b) 4609 (c) 9430

Solution: Using the rule of division by 10, we find that:

(a) On dividing 1997 by 10, we get:

Quotient = 199, remainder = 7.

(b) On dividing 4609 by 10, we get:

Quotient = 460, remainder = 9.

(c) On dividing 9430 by 10, we get:

Quotient = 943, remainder = 0.

Dividing a Number by 100

Example 3: Dividing each of the following numbers by 100.

(a) 9785 (b) 12467

What do you observe?

Solution:

(a)

$$\begin{array}{r}
97 \\
100\,\overline{)\,9785} \\
-900 \\
\hline
785 \\
-700 \\
\hline
85 \\
\hline
\end{array}$$

∴ Quotient = 97, Remainder = 85.

(b)

$$\begin{array}{r}
124 \\
100\,\overline{)\,12467} \\
-100 \\
\hline
246 \\
-200 \\
\hline
467 \\
-400 \\
\hline
67 \\
\hline
\end{array}$$

Quotient = 124, Remainder = 67.

From the above examples, the following rule is quite clear.

Rule 2: On dividing a number by 100, the quotient is obtained by removing the last two digits on the extreme right of the dividend. The number formed by these last two digits is the remainder.

Thus, in a division sum with divisor 100, we may adopt the above rule.

Example 4: Using the rule of division by 100 find the quotient and the remainder when each of the following numbers is divided by 100.

(a) 6347 (b) 8092 (c) 14506

Solution: Using the rule of division by 100, we find that:

(a) On dividing 6347 by 100, we get:
quotient = 63, remainder = 47.

(b) On dividing 8092 by 100, we get:
quotient = 80, remainder = 92.

(c) On dividing 14506 by 100, we get:
quotient = 145, remainder = 6.

Dividing a Number by 1000

Similar to the above rules, we have the following rule governing the division of a number by 1000.

> **Rule 3:** On dividing a number by 1000, the quotient is obtained by removing the last three digits on the extreme right of the dividend. The number formed by these last three digits is the remainder.

Thus, in a division sum with divisor 1000, we may use the above rule.

Example 5: Using the rule of division by 1000, find the quotient and the remainder when each of the following numbers is divided by 1000.

(a) 3462 (b) 24531 (c) 107246

Solution: Using the rule of division by 1000, we find that:

(a) On dividing 3462 by 1000, we get:
quotient = 3, remainder = 462.

(b) On dividing 24531 by 1000, we get:
quotient = 24, remainder = 531.

(c) On dividing 107246 by 1000, we get:
quotient = 107, remainder = 246.

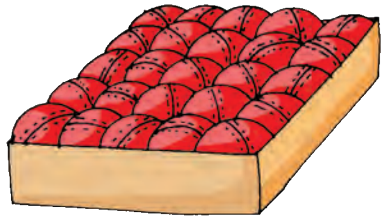
Exercise 17

Using the rules of division by 10, 100 and 1000 find the quotient and the remainder when:

1. 527 ÷ 10
2. 1624 ÷ 10
3. 1006 ÷ 10
4. 648 ÷ 100
5. 1936 ÷ 100
6. 27007 ÷ 100
7. 32505 ÷ 100
8. 6947 ÷ 1000
9. 17065 ÷ 1000
10. 89009 ÷ 1000
11. 683 ÷ 1000
12. 136019 ÷ 1000

Word Problems on Division

Example 1: 8704 balls were packed equally in 34 boxes. How many balls were packed in each box?



Solution: Number of balls in 34 boxes = 8704.

Number of balls in 1 box = 8704 ÷ 34

$$\begin{array}{r|l} & 256 \\ \hline 34 & 8704 \\ & -68 \\ \hline & 190 \\ & -170 \\ \hline & 204 \\ & -204 \\ \hline & 0 \end{array}$$

Hence, the number of balls in each box is 256.

Example 2: If 23 chairs cost ₹ 8855, what is the cost of each chair?

Solution: Cost of 23 chairs = ₹ 8855.

Cost of 1 chair = ₹ (8855 ÷ 23)

$$\begin{array}{r|l} & 385 \\ \hline 23 & 8855 \\ & -69 \\ \hline & 195 \\ & -184 \\ \hline & 115 \\ & -115 \\ \hline & 0 \end{array}$$

Hence, the cost of each chair is ₹ 385.

Example 3: The product of two numbers is 5301. If one of the numbers is 93, find the other.

Solution: Product of two numbers = 5301.

One number = 93.

∴ The other number = 5301 ÷ 93.

$$\begin{array}{r|l} & 57 \\ \hline 93 & 5301 \\ & -465 \\ \hline & 651 \\ & -651 \\ \hline & 0 \end{array}$$

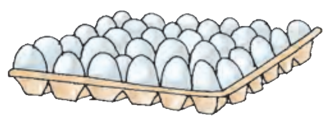
Hence, the other number is 57.

Exercise 18

1. 6426 bags of cement were equally loaded on 17 trucks. How many bags were loaded on each truck?

2. 9240 apples were packed equally in 35 boxes. How many apples were packed in each box?
3. 11760 tins of fruit juice are to be packed in cartons of 48 tins each. How many cartons are needed?

4. 98 bags of wheat can be loaded in a tempo. How many tempos will be needed to load 3038 such bags?
5. Mrs Vandana withdrew ₹ 9040 from her bank account. The cashier paid her the money in 20-rupee denominations. How many notes did she get?
6. A train covers a distance of 8928 km in 24 hours. How much distance does it cover in 1 hour?
7. A chartered bus starting from Delhi for Mussoorie charged ₹ 8851 from 53 passengers. How much money was paid by each passenger?
8. A fruit seller bought 7300 oranges. Out of these, 64 were found rotten. Remaining oranges were packed equally in 67 boxes. Find the number of oranges in each box.



9. 36 eggs can be packed in one tray. How many trays will Rehman need to pack 1264 eggs? How many eggs will be left?
10. A gardener wants to plant 5700 trees in rows. If each row consists of 56 trees, how many complete rows are formed and how many plants will be leftover?
11. The product of two numbers is 9156. If one of the numbers is 84, find the other.
12. How many hours are there in 3240 minutes?

Things to Remember

1. In a multiplication sum:
   (a) The number to be multiplied is called the multiplicand.
   (b) The number with which we multiply is called the multiplier.
   (c) The result after the multiplication is called the product.
2. To multiply a number by 10, we insert one zero to the right of the number.

3. To multiply a number by 100, we insert two zeros to the right of the number.

4. To multiply a number by 1000, we insert three zeros to the right of the number.

5. The product of a number and 1 is the number itself.

6. The product of any number and 0 is always 0.

7. The product does not change when the order of the numbers is changed. This is called the order property of multiplication.

8. The product of three numbers does not change when the grouping of numbers is changed. This is called the grouping property of multiplication.

9. The property $7 \times (8 + 9) = (7 \times 8) + (7 \times 9)$ is called the distributive property of multiplication over addition.

10. In a division sum:

    (a) The number to be divided is called the dividend.

    (b) The number by which we divide is called the divisor.

    (c) The number of times the divisor is contained in the dividend is called the quotient.

    (d) After subtracting the product of divisor and quotient from the dividend, we get the remainder.

11. Dividend = (Divisor × Quotient) + Remainder

12. The division of any number by 0 has no meaning.

13. 0 divided by a non-zero number gives 0 as quotient.

14. A number divided by 1 gives the number as the quotient.

15. When a non-zero number is divided by itself, the quotient is 1.

16. On dividing a number by 10, the quotient is obtained by removing the ones digit from the number and the remainder is the one's digit.

17. On dividing a number by 100, the quotient is obtained by removing the last two digits on the extreme right of the dividend. The number formed by these last two digits is the remainder.

18. On dividing a number by 1000, the quotient is obtained by removing the last three digits on the extreme right of the dividend. The number formed by these last three digits is the remainder.

C.C.E. Drill 4

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. Which of the following does not equal to 1500?

(a) 3×500 (b) 300×50 (c) 30×50 (d) 300×5

2. Which of the following does not equal to 1800?

(a) 60×30 (b) 45×40 (c) 90×20 (d) 150×120

3. Which of the following statements is correct?

(a) $(8 \times 3) \times 4 = 8 \times (4 \times 3)$ (b) $(8 \times 4) \times 3 = 8 \times (4 + 3)$

(c) $(8 \times 4) \times 3 = (8 \times 4) + 3$ (d) $(8 \times 4) \times 3 = (8 + 4) \times 3$

4. $11341 \div 11 = ?$

(a) 131 (b) 1031 (c) 1310 (d) 1301

5. The product of all odd numbers between 3 and 8 is

(a) 105 (b) 35 (c) 12 (d) 28

6. In which number sentence does 15 make the equation true?

(a) $180 \div \square = 12$ (b) $150 \div \square = 15$

(c) $100 \div \square = 4$ (d) $105 \div \square = 15$

7. $100 \times 1000 \times$ .... = 100000

(a) 10 (b) 1 (c) 0 (d) 100

8. Which digit should come in place of $\square$ so that the given multiplication is correct?

$$\begin{array}{r} 4\ \square\ 8 \\ \times\quad 8 \\ \hline 3\ 9\ 8\ 4 \\ \hline \end{array}$$

(a) 1 (b) 5

(c) 7 (d) 9

9. 260×60 equals

(a) 1260 (b) 12600 (c) 1560 (d) 15600

10. The remainder obtained on dividing 600 by 7 is

(a) 3 (b) 4 (c) 5 (d) 6

11. $636 \times 100 = 636 \times 4 \times$ ....

The missing number is

(a) 20 (b) 25 (c) 50 (d) 100

12. The product of two numbers is 2175. If one of the numbers is 15, the other number is

(a) 125 (b) 135 (c) 145 (d) 155

13. How many 16s are there in 1264?

(a) 59 (b) 69 (c) 79 (d) 89

14. The number of 6s in the product 5555 × 3 is

(a) 2 (b) 3 (c) 4 (d) None of these

15. The number of 3s in the quotient of 4995 ÷ 15 is

(a) 1 (b) 2 (c) 3 (d) None of these

16. Divide the largest 4-digit number by the largest 2-digit number. The quotient obtained is

(a) 99 (b) 11 (c) 100 (d) 101

17. A school needs 1500 pencils in a year. How many boxes of 30 pencils each must the school buy?

(a) 50 (b) 500 (c) 300 (d) 450

18. A theatre has 68 rows of seats with 24 seats in each row. How many seats are there in the theatre?

(a) 1536 (b) 1632 (c) 1792 (d) 1904

19. A man earns ₹ 2465 every month. How much does he earn in 3 years?

(a) ₹ 73950 (b) ₹ 83810 (c) ₹ 88416 (d) ₹ 88740

20. Mr Roy's car has done 1248 km over 26 days. How many kilometres is that in one day?

(a) 38 (b) 43 (c) 46 (d) 48

21. How many 50-rupee notes can one get for ₹ 8650?

(a) 163 (b) 173 (c) 183 (d) 193

QUESTION BAG 2

1. **Fill in the blanks.**

(a) Multiplicand × Multiplier = ...

(b) Division is equal ....

(c) Multiplication is repeated .... while division is repeated ....

(d) Dividend is exactly divisible by the divisor if the .... is zero.

(e) 983 × 1 = ... and 983 ÷ 1 = ...

(f) 628 × 0 = ... and 0 ÷ 628 = ...

(g) We cannot divide a number by ....

(h) The quotient and dividend are equal when the divisor is ....

(i) The quotient is zero, if the .... is zero.

(j) In the number 35486, place value of 5 × place value of 8 = ...

(k) If multiplicand, multiplier and product are equal, then each of them is equal to ....

(l) If quotient is 1, then .... = ...

(m) The three numbers whose product is equal to their sum are .... , ... and ....

2. State whether each of the following statements is true or false.

(a) The remainder is always smaller than the divisor. ....

(b) 1068 ÷ 0 = 0 ....

(c) 8182 ÷ 8182 = 1. ....

(d) The product is always greater than both the multiplicand and the multiplier. ....

(e) Multiplication of a number by 10 increases the place value of a digit 10 times. ....

(f) We divide the divisor by the dividend. ....

3. Fill in the placeholders.

(a) 14 × 5 = ☐ (b) 16 × 7 = ☐ (c) 18 × 4 = ☐

(d) 12 × 9 = ☐ (e) 19 × 2 = ☐ (f) 15 × 3 = ☐

(g) 13 × 6 = ☐ (h) 17 × 8 = ☐ (i) 20 × 5 = ☐

4. Multiply:

(a) 1297 × 496 (b) 4829 × 385 (c) 5489 × 527

5. Multiply:

(a) 84 × 100 = ☐ (b) 3000 × 100 = ☐

(c) 60 × 100 = ☐ (d) 9300 × 100 = ☐

(e) 856 × 1000 = ☐ (f) 6060 × 1000 = ☐

(g) 900 × ☐ = 90000 (h) 630 × ☐ = 630000

6. Multiply:

(a) 63 × 70 = ☐ (b) 30 × 50 = ☐

(c) 246 × 200 = ☐ (d) 84 × 40 = ☐

(e) $505 \times 90 =$ ☐ (f) $999 \times 30 =$ ☐

(g) $96 \times 300 =$ ☐ (h) $44 \times 600 =$ ☐

(i) $78 \times 800 =$ ☐ (j) $222 \times 70 =$ ☐

7. Divide:

(a) $10648 \div 27$ (b) $79041 \div 53$ (c) $60350 \div 86$

8. What is the least number that should be subtracted from 18448 to make it exactly divisible by 48?

9. The annual salary of a man is ₹ 2,92,380. What is his monthly salary?

10. How many minutes are there in the month of April?

11. Multiply the greatest 4-digit number with the greatest 2-digit number.

12. Fill in the placeholders.

(a) $36 \div 18 =$ ☐ (b) $360 \div 18 =$ ☐

(c) $3600 \div 18 =$ ☐ (d) $36000 \div 18 =$ ☐

(e) $9000 \div 3 =$ ☐ (f) $9000 \div 30 =$ ☐

(g) $9000 \div 300 =$ ☐ (h) $9000 \div 3000 =$ ☐

13. Complete the following table.

	Dividend	Divisor	Quotient	Remainder
(a)	84096	1000		
(b)	9804	100		
(c)	6356		63	
(d)	80702		80	

14. A travel agency paid ₹ 86886 as airfare for 18 tickets to travel from Delhi to Goa. What was the cost of one ticket?

15. A block of houses in a colony has 15 buildings. Each building has 7 storeys. Each storey has 4 flats and each flat has 3 rooms. How many rooms are there in the block?

16. Divide the smallest 5-digit number by 29.

6 Factors and Multiples

Factors

When a number divides another number exactly, then the divisor is called a factor of the dividend.

Examples:

I. We know that 4 divides 12 exactly.

$\therefore$ 4 is a factor of 12.

II. We know that 7 divides 35 exactly.

$\therefore$ 7 is a factor of 35.

III. We know that $8 \times 9 = 72$.

Clearly, each one of 8 and 9 divides 72 exactly.

$\therefore$ Each one of 8 and 9 is a factor of 72.

IV. We know that $3 \times 4 \times 7 = 84$.

Clearly, each one of 3, 4 and 7 divides 84 exactly.

$\therefore$ Each one of 3, 4 and 7 is a factor of 84.

Solved Examples

Example 1: Is 11 a factor of 1034?

Solution: Let us divide 1034 by 11.

Clearly, 11 divides 1034 exactly.

$\therefore$ 11 is a factor of 1034.

$$\begin{array}{r|l} & \,94 \\ \hline 11 & 1034 \\ & -99 \\ \hline & 44 \\ & -44 \\ \hline & 0 \end{array}$$

Example 2: Show that 15 is not a factor of 1309.

Solution: Let us divide 1309 by 15.

Clearly, on dividing 1309 by 15, we get 4 as remainder.

$\therefore$ 1309 is not completely divisible by 15.

Hence, 15 is not a factor of 1309.

$$\begin{array}{r|l} & \,87 \\ \hline 15 & 1309 \\ & -120 \\ \hline & 109 \\ & -105 \\ \hline & 4 \end{array}$$

Example 3: **Find all the factors of 48.**

Solution: We have:

$48 = 1 \times 48;$

$48 = 2 \times 24;$

$48 = 3 \times 16;$

$48 = 4 \times 12;$

$48 = 6 \times 8.$

$\therefore$ All the factors of 48 are: 1, 2, 3, 4, 6, 8, 12, 16, 24, 48.

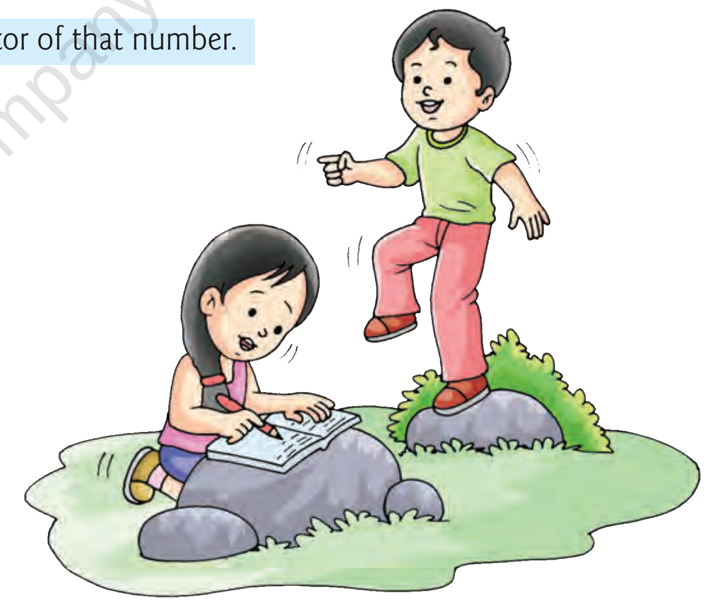
Properties of Factors

1. Every non-zero number has a limited number of factors.

Examples: (i) All the factors of 15 are: 1, 3, 5, 15.

(ii) All the factors of 24 are: 1, 2, 3, 4, 6, 8, 12, 24.

2. 1 is a factor of every number and it is the smallest factor of that number.



Examples: (i) 1 is the smallest factor of 6.

(ii) 1 is the smallest factor of 17.

3. Every non-zero number is the largest factor of itself.

Examples: (i) 16 is the largest factor of 16.

(ii) 23 is the largest factor of 23.

4. Every non-zero number is a factor of 0.

Examples: 2 is a factor of 0; 3 is a factor of 0, etc.

5. We know that division by 0 is meaningless.

$\therefore$ 0 is not a factor of any number.

6. Every factor of a non-zero number is either less than or equal to the given number.

Examples: All the factors of 20 are: 1, 2, 4, 5, 10, 20.

Clearly, each one of them is less than or equal to 20.

Highest Common Factor (HCF)

The HCF of some given numbers is the largest number that divides each one of them exactly.

Study the following examples.

Example 4: Find the HCF of 6 and 9.

Solution: $\left.\begin{array}{l} 6 = 1 \times 6; \\ 6 = 2 \times 3 \end{array}\right\} \therefore$ Factors of 6 are: 1, 2, 3, 6.

$\left.\begin{array}{l} 9 = 1 \times 9; \\ 9 = 3 \times 3 \end{array}\right\} \therefore$ Factors of 9 are: 1, 3, 9.

$\therefore$ Common factors of 6 and 9 are: 1, 3.

Hence, the HCF of 6 and 9 is 3.

Example 5: Find the HCF of 18 and 27.

Solution: We have:

$\left.\begin{array}{l} 18 = 1 \times 18; \\ 18 = 2 \times 9; \\ 18 = 3 \times 6; \end{array}\right\} \therefore$ Factors of 18 are: 1, 2, 3, 6, 9, 18.

$\left.\begin{array}{l} 27 = 1 \times 27; \\ 27 = 3 \times 9 \end{array}\right\} \therefore$ Factors of 27 are: 1, 3, 9, 27.

$\therefore$ Common factors of 18 and 27 are: 1, 3, 9.

Hence, the HCF of 18 and 27 is 9.

Example 6: Find the HCF of 16 and 23.

Solution: We have:

$\left.\begin{array}{l} 16 = 1 \times 16; \\ 16 = 2 \times 8; \\ 16 = 4 \times 4; \end{array}\right\} \therefore$ Factors of 16 are: 1, 2, 4, 8, 16.

$23 = 1 \times 23\} \therefore$ Factors of 23 are: 1, 23.

$\therefore$ Common factors of 16 and 23 is only 1.

$\therefore$ HCF of 16 and 23 is 1.

Exercise 19

1. Answer the following questions.

(a) Is 7 a factor of 63? ....

(b) Is 11 a factor of 110? ....

(c) Is 9 a factor of 91? ....

(d) Is 16 a factor of 8? ....

(e) Is 5 a factor of 0? ....

(f) Is 0 a factor of 8? ....

2. Find all the factors of:

(a) 42 (b) 56 (c) 64 (d) 72

3. Find all the factors of:

(a) 96 (b) 108 (c) 136

4. Check by division method whether 6 is a factor of 1296.

5. Check by division method whether 8 is a factor of 274.

6. Show that 14 is a factor of 1246.

7. Show that 17 is a factor of 612.

8. Show that 25 is not a factor of 245.

9. Show that 23 is a factor of 1081.

10. Show that 73 is not a factor of 9423.

11. Show that 86 is a factor of 17802.

12. Write the smallest and the largest factors of 21.

13. Find the HCF of:

(a) 8 and 12 (b) 16 and 24 (c) 27 and 36

(d) 14 and 42 (e) 56 and 96 (f) 16 and 21

Multiples

When a number divides another number exactly, then the dividend is called a multiple of the divisor.

Examples:

I. We know that 8 divides 32 exactly.

$\therefore$ 32 is a multiple of 8.

II. We know that $7 \times 9 = 63$.

$\therefore$ 63 is a multiple of each one of 7 and 9.

III. (i) Multiples of 2 are: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, ...

(ii) Multiples of 3 are: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, ...

(iii) Multiples of 4 are: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, ...

(iv) Multiples of 5 are: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, ...

(v) Multiples of 9 are: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90, ...

Solved Examples

Example 1: **Is 1378 a multiple of 13?**

Solution: Let us divide 1378 by 13.

$$\begin{array}{r} 106 \\ 13\overline{)\,1378} \\ -13 \\ \hline 78 \\ -78 \\ \hline 0 \end{array}$$

Clearly, 13 divides 1378 exactly.

∴ 13 is a factor of 1378.

Hence, 1378 is a multiple of 13.

Example 2: **Show that 3028 is not a multiple of 29.**

Solution: Let us divide 3028 by 29.

$$\begin{array}{r} 104 \\ 29\overline{)\,3028} \\ -29 \\ \hline 128 \\ -116 \\ \hline 12 \end{array}$$

On dividing 3028 by 29, we get 12 as remainder.

∴ 3028 is not exactly divisible by 29.

Hence, 3028 is not a multiple of 29.

Example 3: **Find first six multiples of 18.**

Solution: The first six multiples of 18 are:

18×1; 18×2; 18×3; 18×4; 18×5 and 18×6.

That is 18, 36, 54, 72, 90, 108.

Hence, the first six multiples of 18 are 18, 36, 54, 72, 90, 108.

Example 4: **Find the 7th multiple of 19.**

Solution: 7th multiple of 19 $= 19 \times 7$

$= 133$.

Properties of Multiples

1. Every non-zero number has unlimited number of multiples.

Examples: Multiples of 10 are:

10, 20, 30, 40, ..., 100, 110, 120, ..., 1000, ..., 10000, ...

Clearly, 10 has unlimited number of multiples.

2. Every number is a multiple of 1.

We know that 1 is a factor of every number.

∴ Every number is a multiple of 1.

Thus, multiples of 1 are: 1, 2, 3, ..., 100, 101, 102, ..., 1000, ...

3. Every non-zero number is a multiple of itself.

Examples: (i) $6 \times 1 = 6 \Rightarrow 6$ is a multiple of 6.

(ii) $23 \times 1 = 23 \Rightarrow 23$ is a multiple of 23.

(iii) $105 \times 1 = 105 \Rightarrow 105$ is a multiple of 105.

4. 0 is a multiple of every non-zero number.

We know that every non-zero number is a factor of 0.

$\therefore$ 0 is a multiple of every non-zero number.

5. Every multiple of a non-zero number is either greater than or equal to the given number.

Examples: Multiples of 5 are 5, 10, 15, 20, 25, ...

Clearly, each one of them is greater than or equal to 5.

6. The first multiple of a number is the number itself.

Examples: (i) First multiple of 9 is 9.

(ii) First multiple of 23 is 23 and so on.

Lowest Common Multiple (LCM)

The LCM of some given numbers is the smallest common multiple of those numbers.

Example 5: Find the LCM of 6 and 8.

Solution: Multiples of 6 are: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, ...

Multiples of 8 are: 8, 16, 24, 32, 40, 48, 56, 64, 72, ...

Common multiples of 6 and 8 are: 24, 48, 72, ...

$\therefore$ LCM of 6 and 8 is 24.

Example 6: Find the LCM of 9 and 12.

Solution: Multiples of 9 are: 9, 18, 27, 36, 45, 54, 63, 72, ...

Multiples of 12 are: 12, 24, 36, 48, 60, 72, ...

Common multiples of 9 and 12 are 36, 72, ...

$\therefore$ LCM of 9 and 12 is 36.

Example 7: Find the LCM of 2, 3 and 4.

Solution: Multiples of 2 are: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, ...

Multiples of 3 are: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, ...

Multiples of 4 are: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, ...

$\therefore$ LCM = The smallest common multiple of 2, 3, 4 = 12.

Exercise 20

1. **Answer the following questions.**
   (a) Is 72 a multiple of 12? ....
   (b) Is 95 a multiple of 19? ....
   (c) Is 58 a multiple of 17? ....
   (d) Is 13 a multiple of 52? ....
   (e) Is 0 a multiple of 6? ....
   (f) Is 8 a multiple of 0? ....
   (g) Is 136 a multiple of 136? ....
   (h) Is 1100 a multiple of 10? ....
2. Write the first ten multiples of 9.
3. Write the first nine multiples of 16.
4. Write the first seven multiples of 23.
5. Examine whether 591 is a multiple of 7.
6. Show that 192 is a multiple of 6.
7. Show that 3016 is a multiple of 29.
8. Show that 10968 is not a multiple of 54.
9. **Find the LCM of:**
   (a) 4 and 6 (b) 5 and 10 (c) 8 and 12
   (d) 6 and 9 (e) 3, 4 and 6 (f) 10, 15 and 20

Prime and Composite Numbers

Prime Numbers

A counting number having exactly two factors is called a prime number.

Examples: Each of the numbers 2, 3, 5, 7, 11, 13, 17, 19, 23, 29 etc. is a prime number.

The smallest prime number is 2.

Composite Numbers

A counting number having more than two factors is called a composite number.

Examples: Each of the numbers 4, 6, 8, 9, 10, 12, 14, 15, 16 etc. is a composite number.

Note that: 1 is neither prime nor composite.

Sieve of Eratosthenes

The method of finding all prime numbers from 1 to 100 was invented by a Greek mathematician Eratosthenes. This method is given below.

Method: Make a table having 10 rows and 10 columns. Write down all counting numbers from 1 to 100 as shown below. Now, proceed according to the following steps:

Step 1: In this table, cross out 1.

Step 2: Note that 1 is neither prime nor composite.

Step 3: Cross out all multiples of 2, except 2.

Step 4: Cross out all multiples of 3, except 3.

Step 5: Cross out all multiples of 5, except 5.

Step 6: Cross out all multiples of 7, except 7.

Sieve of Eratosthenes

~~1~~	2	3	~~4~~	5	~~6~~	7	~~8~~	~~9~~	~~10~~
11	~~12~~	13	~~14~~	~~15~~	~~16~~	17	~~18~~	19	~~20~~
~~21~~	~~22~~	23	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~	29	~~30~~
31	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	37	~~38~~	~~39~~	~~40~~
41	~~42~~	43	~~44~~	~~45~~	~~46~~	47	~~48~~	~~49~~	~~50~~
~~51~~	~~52~~	53	~~54~~	~~55~~	~~56~~	~~57~~	~~58~~	59	~~60~~
61	~~62~~	~~63~~	~~64~~	~~65~~	~~66~~	67	~~68~~	~~69~~	~~70~~
71	~~72~~	73	~~74~~	~~75~~	~~76~~	~~77~~	~~78~~	79	~~80~~
~~81~~	~~82~~	83	~~84~~	~~85~~	~~86~~	~~87~~	~~88~~	89	~~90~~
~~91~~	~~92~~	~~93~~	~~94~~	~~95~~	~~96~~	97	~~98~~	~~99~~	~~100~~

Now, encircle the numbers which are not crossed.
Each of the encircled numbers is a prime number.

Thus, all prime numbers from 1 to 100 are:
2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89 and 97. Thus, there are 25 prime numbers from 1 to 100.

Exercise 21

1. **Fill in the blanks.**
   - (a) The smallest prime number is ....
   - (b) The number which is neither prime nor composite is ....
   - (c) The first odd prime number is ....
   - (d) The smallest even composite number is ....
   - (e) The smallest odd composite number is ....
   - (f) All even numbers except 2 are .... numbers.
2. Write all prime numbers less than 40.
3. Write all prime numbers between 40 and 80.
4. Write all prime numbers between 80 and 100.
5. Write all composite numbers between 40 and 60.

Prime Factorisation

The method of expressing a composite number as the product of prime factors is called prime factorisation.

We may resolve a number into its prime factors by building factor trees as under:

Step 1: Find the least prime number by which the given number is divisible. Resolve the number into two factors taking this prime number as one of them.

Step 2: Resolve the second factor further into two factors out of which at least one factor is prime.

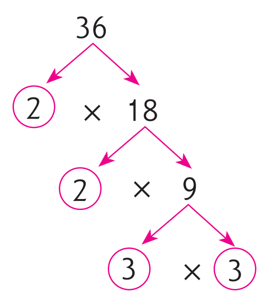
Step 3: Go on splitting the factors till you get all the prime factors.

Step 4: Circle all the prime factors.

Example: **Find the prime factorisation of each of the following numbers by building factor trees:**

(a) 36 (b) 84

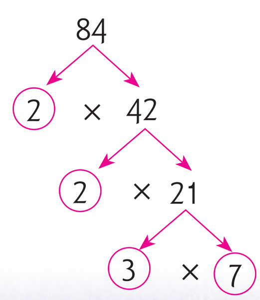
Solution: (a) We have:



Thus, we write the prime factorisation of 36 as:

$36 = 2 \times 2 \times 3 \times 3$.

(b) We have:



Thus, we write the prime factorisation of 84 as:

$84 = 2 \times 2 \times 3 \times 7$.

Exercise 22

Find the prime factorisation of each of the following numbers by building factor trees.

1. 48	**2.** 63	**3.** 78	**4.** 56
5. 90	**6.** 92	**7.** 96	**8.** 105

Tests of Divisibility

Test of Divisibility by 2

A given number is divisible by 2, if its unit digit is 0, 2, 4, 6 or 8.

Examples:

(a) Each of the numbers 1560, 5372, 7164, 9376 and 7538 is divisible by 2.

(b) Out of the numbers 5421, 6703, 9105, 5467 and 3149, none is divisible by 2.

Even Numbers

Every number divisible by 2, is called an even number.

Examples:

Each of the numbers 1560, 1472, 2954, 3796 and 5408 is an even number.

Odd Numbers

A number which is not divisible by 2, is called an odd number.

Examples:

Each of the numbers 7681, 5473, 6125, 4037 and 8119 is an odd number.

Test of Divisibility by 3

A given number is divisible by 3, if the sum of its digits is divisible by 3.

Examples:

(a) Consider the number 57102.

Sum of its digits = $(5 + 7 + 1 + 0 + 2) = 15$, which is divisible by 3.

$\therefore$ 57102 is divisible by 3.

(b) Consider the number 61702.

Sum of its digits = $(6 + 1 + 7 + 0 + 2) = 16$, which is not divisible by 3.

$\therefore$ 61702 is not divisible by 3.

Test of Divisibility by 5

A given number is divisible by 5, if its unit digit is 0 or 5.

Examples:

(a) Each of the numbers 7310 and 8135 is divisible by 5.

(b) None of the numbers 2164, 5318, 6027, 5973, 8219 is divisible by 5.

Test of Divisibility by 6

A given number is divisible by 6, if it is divisible by both 2 and 3.

Examples:

(a) Consider the number 13074.
Its unit digit is 4. So, it is divisible by 2.
Sum of its digits = (1 + 3 + 0 + 7 + 4) = 15, which is divisible by 3.
∴ 13074 is divisible by 3.
Thus, 13074 is divisible by both 2 and 3.
Hence, it is divisible by 6.

(b) Consider the number 47061.
Its unit digit is 1. So, it is not divisible by 2.
Hence, 47061 is not divisible by 6.

(c) Consider the number 53204.
Sum of its digits = (5 + 3 + 2 + 0 + 4) = 14, which is not divisible by 3.
∴ 53204 is not divisible by 3.
Hence, 53204 is not divisible by 6.

Test of Divisibility by 9

A given number is divisible by 9, if the sum of its digits is divisible by 9.

Examples:

(a) Consider the number 14607.
Sum of its digits = (1 + 4 + 6 + 0 + 7) = 18, which is divisible by 9.
∴ 14607 is divisible by 9.

(b) Consider the number 32604.
Sum of its digits = (3 + 2 + 6 + 0 + 4) = 15, which is not divisible by 9.
∴ 32604 is not divisible by 9.

Test of Divisibility by 10

A given number is divisible by 10, if its unit digit is 0.

Examples:

(a) Each of the numbers 5370, 9140, 8650, 7210 is divisible by 10.

(b) Out of the numbers 6342, 5104, 7521, 8063, 5169 etc., none is divisible by 10.

Exercise 23

1. Which of the following numbers are divisible by 2?

(a) 36708 (b) 97103 (c) 45716 (d) 23104
(e) 57421 (f) 65902 (g) 64285 (h) 5790

2. **Which of the following numbers are divisible by 3?**

(a) 2382 (b) 23456 (c) 4506 (d) 30471
(e) 103426 (f) 40513 (g) 57102 (h) 38211

3. **Which of the following numbers are divisible by 6?**

(a) 7848 (b) 19284 (c) 12322 (d) 17076
(e) 15362 (f) 9999 (g) 10758 (h) 14310

4. **Which of the following numbers are divisible by 5?**

(a) 130705 (b) 26508 (c) 194260 (d) 53914
(e) 679352 (f) 123405 (g) 3760106 (h) 957180

5. **Which of the following numbers are divisible by 9?**

(a) 57123 (b) 93311 (c) 324501 (d) 63027
(e) 689301 (f) 23549 (g) 546327 (h) 264503

6. **Which of the following numbers are divisible by 10?**

(a) 23570 (b) 93257 (c) 101010 (d) 463512
(e) 53208 (f) 815305 (g) 379180 (h) 1111010

7. **Separate the even and odd numbers from the following.**

(a) 369725 (b) 397256 (c) 549032 (d) 510570
(e) 502104 (f) 648307 (g) 467051 (h) 962048

Things to Remember

1. When two or more numbers are multiplied to give a product, then each of the numbers is called a factor of the product. Also, the product is called a multiple of that number.
2. 1 is a factor of every number, and 0 is a multiple of every number.
3. Every non-zero number is a factor, as well as a multiple of itself.
4. The greatest of the common factors of two or more numbers is called their HCF.
5. The smallest of the common multiples of two or more numbers is called their LCM.
6. Numbers having exactly two factors, namely 1 and the number itself, are called prime numbers.
7. Numbers having more than two factors are called composite numbers.
8. 1 is neither prime nor composite.
9. The only even prime number is 2.
10. A number is divisible by 2, if its unit digit is even.
11. A number is divisible by 3, if the sum of its digits is divisible by 3.
12. A number is divisible by 9, if the sum of its digits is divisible by 9.
13. A number is divisible by 5, if its unit digit is 0 or 5.
14. A number is divisible by 10, if its unit digit is 0.

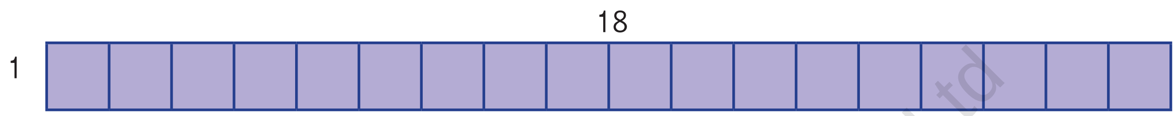
Activity Time

To Find the Factors of a Number

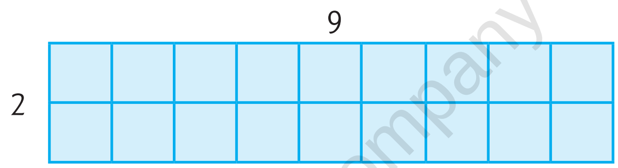
Take a square lined paper as is given in your Mathematics notebook.

Let us find the factors of any number, say 18. We shall do this by arranging 18 squares to form all possible perfect rectangles and squares. Thus, we proceed stepwise as shown below.

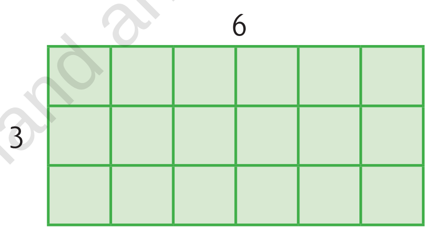
1. First colour 1 row having 18 squares.

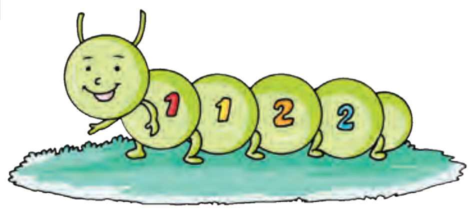


2. Now, colour 2 rows having 9 squares each.



3. Now, colour 3 rows having 6 squares each.



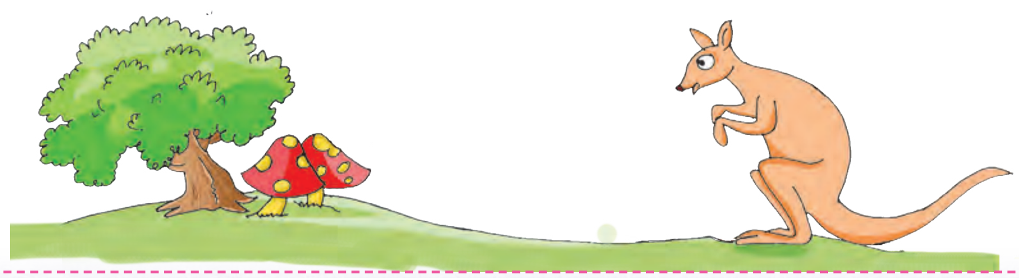


It is now clear that the factors of 18 are:

1, 2, 3, 6, 9 and 18.

Now, using the above method, find all the factors of:

(a) 20 (b) 24 (c) 36 (d) 40



C.C.E. Drill 5

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. The smallest prime number is

(a) 0 (b) 1 (c) 2 (d) 3

2. The number 24 has .... factors.

(a) two (b) four (c) six (d) eight

3. Pick out the prime number from the following:

(a) 17 (b) 27 (c) 39 (d) 49

4. In which of the following is the first number not a factor of the second number?

(a) 4, 76 (b) 12, 136 (c) 15, 495 (d) 18, 918

5. 8424 is divisible by

(a) 2 (b) 3 (c) 9 (d) all of these

6. HCF of 36 and 48 is

(a) 8 (b) 12 (c) 16 (d) 18

7. LCM of 3, 8 and 12 is

(a) 12 (b) 16 (c) 18 (d) 24

8. Every number is a multiple of .... .and ....

(a) 0, 1 (b) 0, itself (c) 1, itself (d) None of these

9. Which of the following is a prime number?

(a) 91 (b) 93 (c) 97 (d) 99

10. The sum of the least prime number and the least composite number is

(a) 1 (b) 2 (c) 4 (d) 6

11. The number which is divisible by 3 but not by 9 is

(a) 45 (b) 57 (c) 99 (d) 126

12. LCM of 6, 12 and 18 is

(a) 18 (b) 36 (c) 24 (d) 72

13. The prime factorisation of 24 is

(a) $2 \times 3 \times 4$ (b) 6×4 (c) 8×3 (d) $2 \times 2 \times 2 \times 3$

14. Which of the following statements is false?

(a) Every number is both a factor and a multiple of itself.

(b) 56 is a multiple of each one of 4, 7 and 8.

(c) 1 is called a unique number because it has only one factor.

(d) 30615 is divisible by 9.

15. The sum of prime numbers between 20 and 30 is

(a) 23 (b) 50 (c) 51 (d) 52

QUESTION BAG 2

1. Fill in the blanks.

(a) The smallest composite number is ....

(b) .... is a factor of every number.

(c) The greatest prime number less than 100 is ....

(d) There are .... prime numbers between 40 and 50.

(e) There are .... prime numbers between 1 and 10.

(f) Every non-zero number other than 1 has at least .... factors.

(g) Every non-zero number is the .... factor and .... multiple of itself.

(h) The multiples of 8 lying between 50 and 70 are .... and ....

(i) The product is called a .... of each of the multiplicand and the multiplier.

(j) The only consecutive numbers which are prime are .... and ....

(k) A number has .... number of factors and .... number of multiples.

(l) The smallest odd composite number is ....

(m) The smallest number you should add to an odd number to make it even is ....

2. State whether each of the following statements is true or false.

(a) 1 is a composite number. ....

(b) 1 is a multiple of every number. ....

(c) 2, 4, 6, 8, 12 are all multiples of 4. ....

(d) No even number is a prime number. ....

(e) The multiple of an even number is always an even number. ....

(f) The multiple of an odd number can be an odd or an even number. ....

(g) Every number divisible by 10 is also divisible by 5. ....

(h) Every number divisible by 2 is also divisible by 6. ....

(i) A factor of a number may be greater than the number. ....

(j) Every odd number is not a prime number. ....

(k) A number which is not prime must be a composite number. ....

(l) The common factors of 30 and 36 are 1, 2, 3 and 6. ....

(m) To check if a number is a factor of the other, we divide. ....

3. State all the factors of:

(a) 54 (b) 84 (c) 144 (d) 196

4. (a) Write all the even multiples of 3 between 10 and 30.

(b) Write all the odd multiples of 7 between 20 and 50.

5. **Write '*Yes*' if the first number is a factor of the second number, otherwise write 'No'.**

(a) 16, 112 (b) 28, 952 (c) 13, 104 (d) 29, 232
(e) 24, 326 (f) 18, 280

6. **Find the first two common multiples of:**

(a) 3, 5 (b) 5, 6 (c) 4, 5 (d) 6, 9

7. **Find the common factors of:**

(a) 25, 40 (b) 28, 42 (c) 36,45 (d) 49, 63 (e) 30, 36

8. **Find the HCF of:**

(a) 9 and 12 (b) 15 and 25 (c) 18 and 24 (d) 20 and 28
(e) 45 and 75 (f) 54 and 81

9. **Find the LCM of:**

(a) 3 and 5 (b) 5 and 6 (c) 10 and 15 (d) 12 and 16
(e) 12 and 18 (f) 2, 6 and 8

10. **Circle the prime numbers.**

(a) 7 17 27 37 47 57 67 77 87 97 (b) 9 19 29 39 49 59 69 79 89 99

11. **Circle the composite numbers.**

(a) 1 11 21 31 41 51 61 71 81 91 (b) 3 13 23 33 43 53 63 73 83 93

12. **Complete the table given below.**

	A number is divisible by	**If the unit digit is**
(a)	2	
(b)	5	
(c)	10	

13. Encircle the numbers divisible by 2.
36 49 52 88 147 233 876 1394

14. Encircle the numbers divisible by 3.
78 83 163 256 468 888 1036 1671

15. Encircle the numbers divisible by 9.
191 351 636 1043 1241 2052 3735

16. **Check the divisibility and put a (✓), if the number is divisible and (×) if it is not.**

	Number	**Divisible by**					
		2	3	5	6	9	10
(a)	42525						
(b)	30240						
(c)	12540						
(d)	83835						
(e)	144342						
(f)	17200						

7 Number Patterns

A 'pattern' means 'a definite sequence or order'.

Sometimes, while attempting the same operations on different sets of numbers, we come across a pattern or sequence in the repetition or occurrence of numerals in the results so obtained. Finding out this pattern may help us find the answer to a similar question involving large numbers, which may otherwise prove to be a hard task.

Let us observe some interesting number patterns.

Patterns on the Number Grid

Rows ↓

Columns →

	I	II	III	IV	V	VI	VII	VIII	IX	X
I	1	2	3	4	5	6	7	8	9	10
II	11	12	13	14	15	16	17	18	19	20
III	21	22	23	24	25	26	27	28	29	30
IV	31	32	33	34	35	36	37	38	39	40
V	41	42	43	44	45	46	47	48	49	50
VI	51	52	53	54	55	56	57	58	59	60
VII	61	62	63	64	65	66	67	68	69	70
VIII	71	72	73	74	75	76	77	78	79	80
IX	81	82	83	84	85	86	87	88	89	90
X	91	92	93	94	95	96	97	98	99	100

Pattern 1: All numbers in column I end with 1, all numbers in column II end with 2, and so on.

Pattern 2: If we leave out column X, all numbers in Row II begin with 1, all numbers in Row III begin with 2, and so on.

Pattern 3: Numbers in each row increase by one (+ 1).

Pattern 4: Numbers in each column increase by 10 (+ 10).

Pattern 5: Observe the numbers from bottom upwards along the slanting dotted lines drawn in the above grid.

The last number along each slanting line gives the sum of the digits of each of the numbers lying along that line.

So, the sum of the digits of each number along the slanting line ending at 2, is 2; the sum of the digits of each number along the slanting line ending at 3, is 3; and so on.

Pattern 6: Let us find the sum of the ten numbers in each row. Do you notice any pattern in the sums obtained?

1	+	2	+	3	+	. . .	+	10	=	55
11	+	12	+	13	+	. . .	+	20	=	155
21	+	22	+	23	+	. . .	+	30	=	255
⋮		⋮		⋮		⋮		⋮		⋮
91	+	92	+	93	+		+	100	=	955

Using the above pattern, we get:

41	+	42	+	43	+	. . .	+	50	=	455
51	+	52	+	53	+	. . .	+	60	=	555

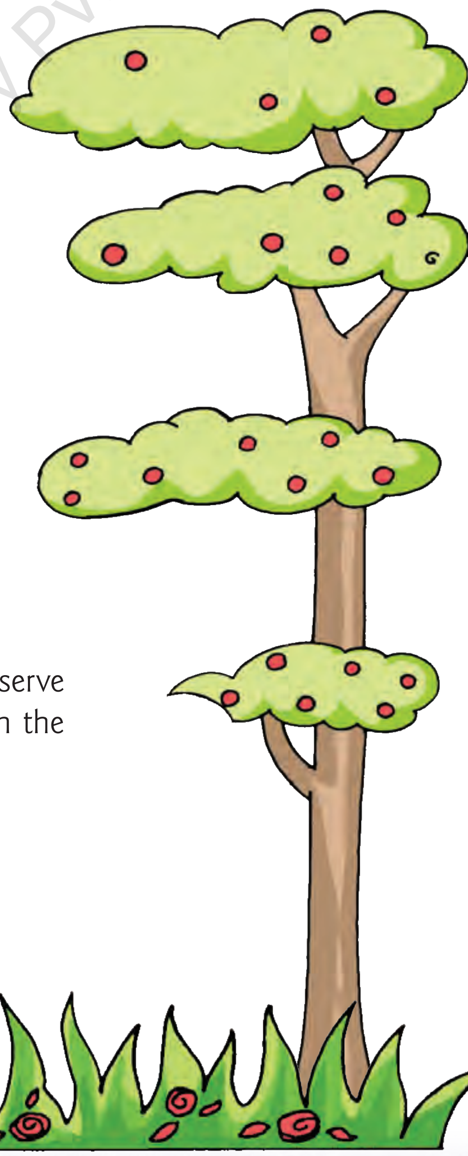
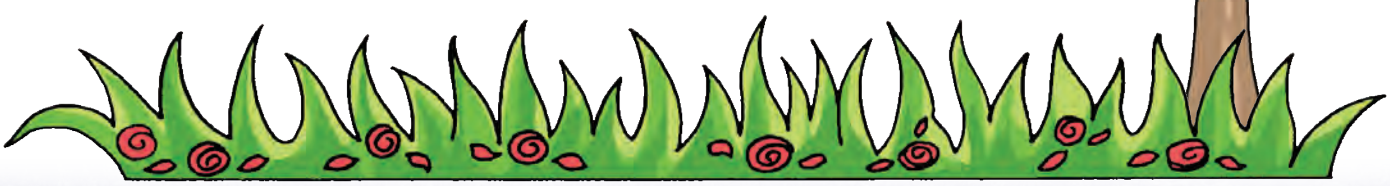


Table Patterns

Let us mark the multiples of 2, 3, 4, 5,... on separate 10 × 10 grids. Observe the pattern followed by shaded boxes in each of the grids shown on the next page.



Multiples of 2

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 3

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 4

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 5

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Number Patterns in Addition of Consecutive Numbers

I. Addition of 3 consecutive numbers

1	+	2	+	3	=	6
2	+	3	+	4	=	9
3	+	4	+	5	=	12
…		…		…		…
8	+	9	+	10	=	27

What do you observe?
We observe that the sums are multiples of 3.
Also, the sum is thrice the middle term.

II. Addition of 4 consecutive numbers

1	+	2	+	3	+	4	=	10
2	+	3	+	4	+	5	=	14
3	+	4	+	5	+	6	=	18
…		…		…		…		…
10	+	11	+	12	+	13	=	46

You can observe that the sum increases by 4 at each step. Also, each sum is twice the sum of the two middle terms.

So, $114 + 115 + 116 + 117 = 2 \times (115 + 116)$
$= 2 \times 231$
$= 462.$

III. Addition of 5 consecutive numbers

1	+	2	+	3	+	4	+	5	=	15
2	+	3	+	4	+	5	+	6	=	20
3	+	4	+	5	+	6	+	7	=	25
…		…		…		…		…		…
15	+	16	+	17	+	18	+	19	=	85

You can see that the sums are multiples of 5.

Adding Odd Numbers

						1	+	3	=	4	(2×2)
				1	+	3	+	5	=	9	(3×3)
		1	+	3	+	5	+	7	=	16	(4×4)
1	+	3	+	5	+	7	+	9	=	25	(5×5)

Carefully, observe the above sums. We find that:

Sum of the first 2 odd numbers = 2 × 2 = 4.
Sum of the first 3 odd numbers = 3 × 3 = 9.
Sum of the first 4 odd numbers = 4 × 4 = 16.
Sum of the first 5 odd numbers = 5 × 5 = 25.

... ...

Sum of the first 10 odd numbers = 10 × 10 = 100.
Sum of the first 11 odd numbers = 11 × 11 = 121.

... ...

Sum of the first 20 odd numbers = 20 × 20 = 400 and so on.

Adding Even Numbers

						2	+	4	=	6	(2 × 3)
				2	+	4	+	6	=	12	(3 × 4)
		2	+	4	+	6	+	8	=	20	(4 × 5)
2	+	4	+	6	+	8	+	10	=	30	(5 × 6)

Carefully, observe the above sums. We find that:

Sum of the first 2 non-zero even numbers = 2 × (2 + 1) = 2 × 3 = 6.
Sum of the first 3 non-zero even numbers = 3 × (3 + 1) = 3 × 4 = 12.
Sum of the first 4 non-zero even numbers = 4 × (4 + 1) = 4 × 5 = 20.

... ...

Sum of first 10 non-zero even numbers = 10 × (10 + 1) = 10 × 11 = 110 and so on.

Patterns in Multiplication

I. Multiplication of numbers consisting of1s

1	×	1	=	1
11	×	11	=	121
111	×	111	=	12321
1111	×	1111	=	1234321

In the above pattern, we find that:

(a) When the 2-digit number 11 is multiplied by itself, the middle digit in the product is 2;

(b) When the 3-digit number 111 is multiplied by itself, the middle digit in the product is 3;

(c) When the 4-digit number 1111 is multiplied by itself, the middle digit in the product is 4; and so on.

II. Multiplication of numbers ending with 5

Observe the following and see the pattern:

1 5	2 5	11 5
2 × 1 5	3 × 2 5	12 × 11 5
2 25	6 25	132 25

Similarly, 65 × 65 = 42 25

6 × 7   5 × 5

125 × 125 = 156 25

12 × 13   5 × 5

155 × 155 = 240 25

15 × 16   5 × 5

Solved Examples

Example 1: Observe each of the following number patterns and extend them by three more terms.

(a) 3, 6, 9, 12, ..., ..., ...

(b) 95, 88, 81, 74, ..., ..., ...

(c) 4, 8, 16, 32, ..., ..., ...

Solution: (a) Observing the given pattern, we find that each number in the pattern is 3 more than the preceding number.
Thus, 3 + 3 = 6, 6 + 3 = 9, 9 + 3 = 12.
So, the next three terms will be:
12 + 3 = 15; 15 + 3 = 18; 18 + 3 = 21.
Hence, the pattern becomes:
3, 6, 9, 12, 15, 18, 21.

(b) Observing the given pattern, we find that each number in the pattern is 7 less than the preceding number.
Thus, 95 – 7 = 88, 88 – 7 = 81, 81 – 7 = 74.

So, the next three terms will be:

$74 - 7 = 67, \ 67 - 7 = 60, \ 60 - 7 = 53.$

Hence, the pattern becomes:

95, 88, 81, 74, 67, 60, 53.

(c) Observing the given pattern, we find that each number in the pattern is twice the preceding number.

Thus, $4 \times 2 = 8, \ 8 \times 2 = 16, \ 16 \times 2 = 32.$

So, the next three terms will be:

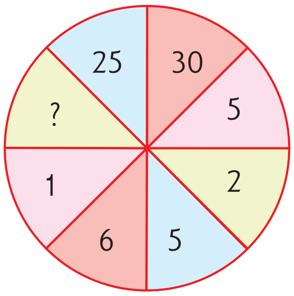
$32 \times 2 = 64, \ 64 \times 2 = 128, \ 128 \times 2 = 256.$

Hence, the pattern becomes:

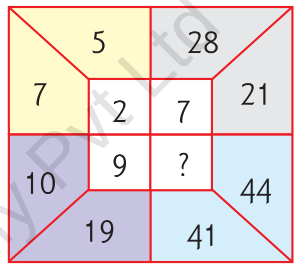
4, 8, 16, 32, 64, 128, 256.

Example 2: Find the missing number in each of the following figures.

(a)

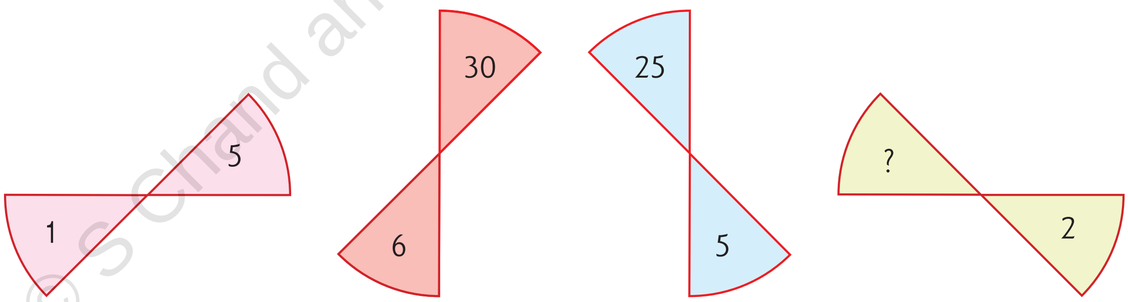


(b)



Solution: (a) Carefully, observing the figure, we find that each number in the upper half is five times the number in the opposite part.

Let us see these parts one by one:



$1 \times 5 = 5$ $6 \times 5 = 30$ $5 \times 5 = 25$

So, ? must be replaced by $2 \times 5 = 10$.

Hence, the missing number is 10.

(b) On seeing the figure closely, we find that each number in the smaller square is the difference of two numbers outside it.

Let's see these parts singly.

$7 - 5 = 2$ $28 - 21 = 7$ $19 - 10 = 9$ $44 - 41 = ?$

Hence, the missing number = $(44 - 41) = 3$.

Exercise 24

1. For each of the following number sequences, find a simple rule to generate the sequence. Describe your rule in words. Use it to write down the next three terms.

(a) 8, 13, 18, 23, ..., ..., ...

(b) 512, 256, 128, ..., ..., ...

(c) 11, 12, 14, 17, ..., ..., ...

(d) 2, 4, 6, 8, 10, ..., ..., ...

(e) 1, 4, 9, 16, ..., ..., ...

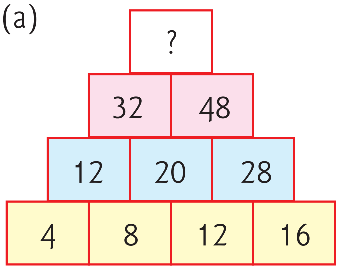
(f) 98, 87, 76, 65, ..., ..., ...

(g) 6, 12, 24, 48, ..., ..., ...

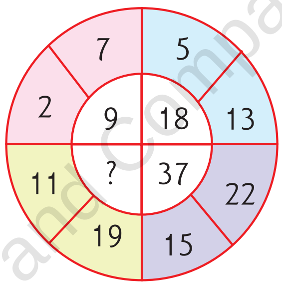
(h) 2, 4, 12, 48, ..., ..., ...

2. Study the pattern and fill in the missing terms.

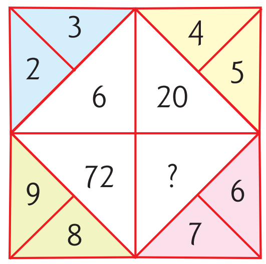
(a)



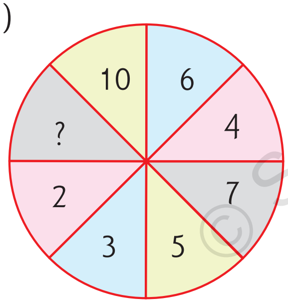
(b)



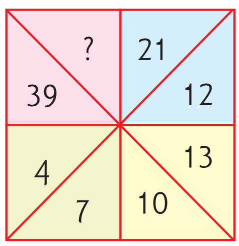
(c)



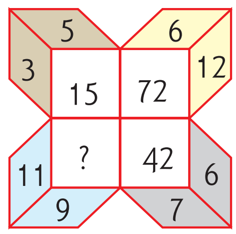
(d)



(e)



(f)



8 Estimation

Rounding Numbers

In our daily life, we come across several situations involving the use of numbers. Sometimes, we do not state the exact number as an answer to the question which requires us to tell about how many.

Instead, we put forth a number which is the nearest multiple of 10 or 100 or 1000 etc.

This is known as rounding the number to the nearest ten or hundred or thousand etc., as the case may be.

Consider the following examples.

Example 1: Suppose there are 2487 students in a school.

If someone asks, "How many students are there in the school?"

We would say that there are about 2500 students in that school.

We have rounded 2487 to the nearest hundred.

Example 2: We know that the population of India is 925636439.

For knowledge's sake, one could say that 'Population of India is about 93 crores.'

Here, we have rounded 925636439 to the nearest crore.

Rounding Numbers to the Nearest Ten

Finding out the multiple of 10 which is nearest to the given number is called the rounding of the given number to the nearest ten.

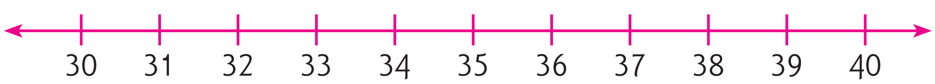
Let us learn how to round off a given number to the nearest ten.

Consider the numbers 33, 37 and 35.

(a) First, we consider 33.

Clearly, 33 lies between 30 and 40.

Draw the number line as shown below.



Clearly, 33 is nearer to 30 than to 40.

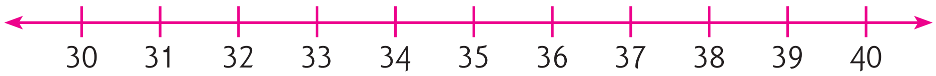
So, we round off 33 to 30.

Hence, 33 rounded to the nearest ten is 30.

(b) Now, we consider 37.

Clearly, 37 lies between 30 and 40.

Draw the number line as shown below.



Clearly, 37 is nearer to 40 than to 30.

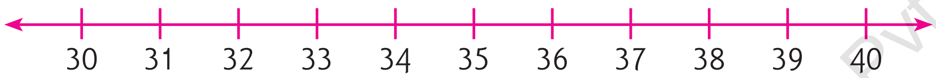
So, we round off 37 to 40.

Hence, 37 rounded to the nearest ten is 40.

(c) Next, we consider 35.

Clearly, 35 lies between 30 and 40.

Draw the number line as shown below.



Clearly, 35 is halfway between 30 and 40.

By convention, we round 35 to 40.

Hence, 35 rounded to the nearest ten is 40.

Note that each one of 31, 32, 33 and 34 is rounded to 30.

And, each one of 35, 36, 37, 38, 39 is rounded to 40.

Rounding a number to a smaller number is known as 'rounding down'.

Rounding a number to a greater number is known as 'rounding up'.

Working rule for rounding a number to the nearest ten

Step 1: Examine the digit at ones place.

Step 2: If the digit at ones place is less than 5, then replace the ones digit by 0 and keep the other digits as they are.

Step 3: If the digit at ones place is 5 or greater than 5, then increase the tens digit by 1 and replace the ones digit by 0.

The following examples will make the ideas more clear.

Example 3: Round off each of the following numbers to the nearest ten.

(a) 714 (b) 926 (c) 2865 (d) 19682

Solution: (a) The given number is 714.

Its ones digit is 4, which is less than 5.

So, replace the ones digit by 0 and keep the other digits as they are.

∴ Rounded number = 710.

(b) The given number is 926.

Its ones digit is 6, which is greater than 5.

So, increase the tens digit by 1 and replace the ones digit by 0.

∴ Rounded number = 930.

(c) The given number is 2865.

Its ones digit is 5.

So, increase the tens digit by 1 and replace the ones digit by 0.

∴ Rounded number = 2870.

(d) The given number is 19682.

Its ones digit is 2, which is less than 5.

So, replace the ones digit by 0 and keep the other digits as they are.

∴ Rounded number = 19680.

Example 4: Think of rounding numbers to the nearest ten. Write the numbers which can be rounded to 670.

Solution : By adopting the rule for rounding the numbers to the nearest ten, we find that the numbers that can be rounded to 670 are:

665, 666, 667, 668, 669, 671, 672, 673 and 674.

Rounding Numbers to the Nearest Hundred

Finding out the multiple of 100 which is nearest to the given number is called the rounding of the given number to the nearest hundred.

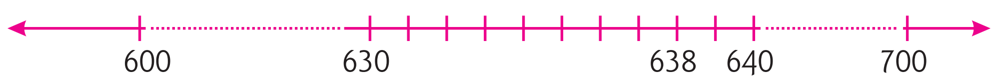
Let us consider the numbers 638, 683 and 650.

We shall learn how to round off these numbers to the nearest hundred.

(a) First, we consider 638.

Clearly, 638 lies between 600 and 700.

Draw the number line as shown below.



Clearly, 638 lies nearer to 600 than to 700.

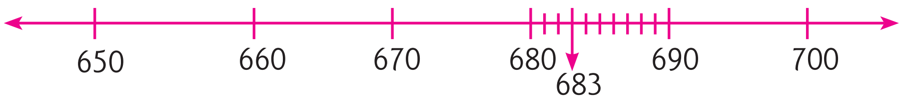
So, we round off 638 to 600.

Hence, 638 rounded to the nearest hundred is 600.

(b) Next, we consider 683.

Clearly, 683 lies between 600 and 700.

Draw the number line as shown below.



Clearly, 683 lies nearer to 700 than to 600.

So, we round off 683 to 700.

Hence, 683 rounded to the nearest hundred is 700.

(c) Next, we consider 650.

Clearly, 650 lies between 600 and 700.

Draw the number line as shown below.

Clearly, 650 is halfway between 600 and 700.

By convention, we round off 650 to 700.

Hence, 650 rounded to the nearest hundred is 700.

Working rule for rounding a number to the nearest hundred

Step 1: Examine the digit at tens place.

Step 2: If the digit at tens place is less than 5, replace each one of the tens and ones digits by 0 and keep the other digits as they are.

Step 3: If the digit at tens place is 5 or greater than 5, increase the hundreds digit by 1 and replace each one of the tens and ones digits by 0.

The following examples will make the ideas more clear.

Example 5: Round off each of the following numbers to the nearest hundred.

(a) 1639 (b) 7482 (c) 8453 (d) 17819

Solution: (a) The given number is 1639.

Its tens digit is 3, which is less than 5.

So, replace each one of tens and ones digits by 0 and keep the other digits as they are.

∴ Rounded number = 1600.

(b) The given number is 7482.

Its tens digit is 8, which is greater than 5.

So, increase the hundreds digit by 1 and replace each one of the tens and ones digits by 0.

∴ Rounded number = 7500.

(c) The given number is 8453.

Its tens digit is 5.

So, increase the hundreds digit by 1 and replace each one of the tens and ones digits by 0.

∴ Rounded number = 8500.

(d) The given number is 17819.

Its tens digit is 1, which is less than 5.

So, replace each one of the tens and ones digits by 0 and keep the other digits as they are.

∴ Rounded number = 17800.

Example 6: Think of rounding to the nearest hundred. What numbers could be rounded to 1900?

Solution: Clearly, all the numbers from 1850 to 1949 can be rounded to 1900, to the nearest hundred.

In a similar process, we may round off the large numbers.

Rounding Numbers to the Nearest Thousand

Rounding a number to the nearest thousand means finding out the multiple of 1000 which is nearest to the given number.

Working rule for rounding a number to the nearest thousand

Step 1: Examine the digit at hundreds place.

Step 2: If the digit at hundreds place is less than 5, replace each one of the digits at hundreds, tens and ones places by 0 and keep all the other digits as they are.

Step 3: If the digit at hundreds place is 5 or greater than 5, increase the digit at thousands place by 1 and replace each one of the digits at hundreds, tens and ones places by 0.

The following examples will make the ideas more clear.

Example 7: Round off each of the following numbers to the nearest thousand.

(a) 9387 (b) 10639 (c) 4579 (d) 17019

Solution: (a) The given number is 9387.

Its digit at hundreds place is 3, which is less than 5.

So, replace each one of the digits at hundreds, tens and ones places by 0 and keep the remaining digit as it is.

∴ Rounded number = 9000.

(b) The given number is 10639.

Its digit at hundreds place is 6, which is greater than 5.

So, increase the digit at thousands place by 1 and replace each one of the digits at hundreds, tens and ones places by 0.

∴ Rounded number = 11000.

(c) The given number is 4579.

Its digit at hundreds place is 5.

So, increase the digit at thousands place by 1 and replace each one of the digits at hundreds, tens and ones places by 0.

∴ Rounded number = 5000.

(d) The given number is 17019.

Its digit at hundreds place is 0, which is less than 5.

So, replace each one of the digits at hundreds, tens and ones places by 0 and keep the other digits as they are.

∴ Rounded number = 17000.

Exercise 25

1. Round off each of the following numbers to the nearest ten.

(a) 73 (b) 67 (c) 294 (d) 405

(e) 861 (f) 1038 (g) 3429 (h) 4516

(i) 12652 (j) 30607

2. Round off each of the following numbers to the nearest hundred.

(a) 346 (b) 917 (c) 493 (d) 1284

(e) 5174 (f) 6251 (g) 9804 (h) 8365

(i) 14627 (j) 26816

3. Round off each of the following numbers to the nearest thousand.

(a) 4278 (b) 7832 (c) 9567 (d) 16278

(e) 26019 (f) 20963 (g) 31274 (h) 48517

Estimation

To estimate means to make a guess.

Estimation, thus, gives us a rough idea of the answer to a question involving operations on numbers. It is an excellent approach for students to use when calculation or checking the reasonableness of answers.

Estimating Sums

For estimation of the sum of given numbers, we round off the given numbers and then find their sum.

Example 1: **Estimate each of the following sums to the nearest ten. Also, find the actual sum.**

(a) 64 + 89 (b) 49 + 32

Solution: (a) We have:

Estimated Sum			Actual Sum
64	$\xrightarrow[\text{nearest ten}]{\text{rounded to}}$	60	64
+ 89	$\xrightarrow[\text{nearest ten}]{\text{rounded to}}$	90	+ 89
		150	153

Thus, the estimate differs from the actual sum by 3.

(b) We have:

Estimated Sum			Actual Sum
49	$\xrightarrow[\text{nearest ten}]{\text{rounded to}}$	50	49
+ 32	$\xrightarrow[\text{nearest ten}]{\text{rounded to}}$	30	+ 32
		80	81

Thus, the estimate differs from the actual sum by 1.

Example 2: **There are 267 boys and 122 girls in a school. Estimate the total number of students in the school.**

Solution: Clearly, to estimate the total number of students, we round off the numbers of boys and girls to the nearest hundred or ten and add.

Rounding off to the nearest hundred, we have:

Estimated sum		Actual sum
267 →	300	267
+ 122 →	100	+ 122
	400	389

Rounding off to the nearest ten, we have:

Estimated sum		Actual sum
267 →	270	267
+ 122 →	120	+ 122
	390	389

Exercise 26

1. Estimate each sum to the nearest ten. Also, find the actual sum.

(a) $\begin{array}{r} 57 \\ +\ 38 \\ \hline \\ \hline \end{array}$ (b) $\begin{array}{r} 87 \\ +\ 19 \\ \hline \\ \hline \end{array}$ (c) $\begin{array}{r} 34 \\ +\ 79 \\ \hline \\ \hline \end{array}$ (d) $\begin{array}{r} 29 \\ +\ 68 \\ \hline \\ \hline \end{array}$

(e) $\begin{array}{r} 95 \\ +\ 58 \\ \hline \\ \hline \end{array}$ (f) $\begin{array}{r} 77 \\ +\ 63 \\ \hline \\ \hline \end{array}$ (g) $\begin{array}{r} 350 \\ +\ 275 \\ \hline \\ \hline \end{array}$ (h) $\begin{array}{r} 562 \\ +\ 181 \\ \hline \\ \hline \end{array}$

2. Estimate each sum to the nearest hundred. Also, find the actual sum.

(a) $\begin{array}{r} 225 \\ +\ 679 \\ \hline \\ \hline \end{array}$ (b) $\begin{array}{r} 458 \\ +\ 334 \\ \hline \\ \hline \end{array}$ (c) $\begin{array}{r} 3170 \\ +\ 5395 \\ \hline \\ \hline \end{array}$

(d) $\begin{array}{r} 5130 \\ +\ 1410 \\ \hline \\ \hline \end{array}$ (e) $\begin{array}{r} 56185 \\ +\ 24322 \\ \hline \\ \hline \end{array}$ (f) $\begin{array}{r} 10083 \\ +\ 29379 \\ \hline \\ \hline \end{array}$

3. Estimate each sum to the nearest thousand. Also, find the actual sum.

(a) $\begin{array}{r} 32829 \\ 16466 \\ +\ 27373 \\ \hline \\ \hline \end{array}$ (b) $\begin{array}{r} 45701 \\ 11371 \\ +\ 33121 \\ \hline \\ \hline \end{array}$ (c) $\begin{array}{r} 21397 \\ 27807 \\ +\ 41705 \\ \hline \\ \hline \end{array}$

4. There are 53 balls in Box A and 69 balls in Box B. Estimate the total number of balls in both the boxes taken together.

5. Rohit has a carton that can hold 100 balls. He has 52 red balls, 26 blue balls and 29 green balls. Will all the balls fit in the box?

6. Aditya purchased a bag for ₹ 378 and a shirt for ₹ 636. Estimate the total money spent by him on both the items.

7. Anand has ₹ 500. He wants to buy a dictionary for ₹ 274 and a novel for ₹ 185. Does he have enough money?

Estimating Difference

Example: **Estimate the difference 662 – 254 to the nearest hundred. Then, verify by finding the actual difference.**

Solution: Rounding off the numbers to the nearest hundred, we have:

Estimated difference	Actual difference
662 → 700	662
– 254 → 300	– 254
400	408

Thus, the estimate differs from the actual difference by 8.

Exercise 27

1. Estimate each difference to the nearest ten. Also, find the actual difference.

(a) 53 – 18

(b) 72 – 25

(c) 97 – 38

(d) 409 – 148

(e) 956 – 439

(f) 650 – 299

(g) 3618 – 1289

(h) 8906 – 2455

2. Estimate each difference to the nearest hundred. Also, find the actual difference.

(a) 678 – 202

(b) 956 – 572

(c) 7158 – 2429

(d) 5672 – 3085

(e) 85093 – 41397

(f) 34921 – 18179

3. Estimate each difference to the nearest thousand. Also, find the actual difference.

(a) 37660 – 26766

(b) 17807 – 8197

(c) 46005 – 39466

Estimating Products

Example 1: Estimate the product of 32 and 68.

Solution: 32 estimated to the nearest ten = 30.

68 estimated to the nearest ten = 70.

Hence, estimated product of 32 and 68 = 30×70

= 2100.

Example 2: Estimate the product of 24 and 65.

Solution: 24 estimated to the nearest ten = 20.

65 estimated to the nearest ten = 70.

Hence, estimated product of 24 and 65 = 20×70

= 1400.

Example 3: Estimate the product of 386 × 218 by rounding off each number to the nearest hundred.

Solution: 386 estimated to the nearest hundred = 400.

218 estimated to the nearest hundred = 200.

Hence, estimated product = 400×200

= 80000.

Example 4: Estimate the product of 183 × 153 by rounding off the first number upwards and the second number downwards.

Solution: 183 estimated upwards = 200.

153 estimated downwards = 100.

Hence, estimated product = 200×100

= 20000.

Exercise 28

1. **Estimate each of the following products by rounding off each number to the nearest ten.**

   (a) 28×53 (b) 42×75 (c) 54×47 (d) 62×59

2. **Estimate each of the following products by rounding off each number to the nearest hundred.**

   (a) 378×119 (b) 264×147 (c) 408×291 (d) 271×330

3. **Estimate each of the following products by rounding off the first number upwards and the second number downwards.**

   (a) 184×152 (b) 355×450 (c) 267×146

C.C.E. Drill 6

1. Fill in the blanks.

(a) 9098 rounded to the nearest ten is ....

(b) 6066 rounded to the nearest hundred is ....

(c) 2450 rounded to the nearest hundred is ....

(d) 3572 rounded to the nearest thousand is ....

(e) 29643 rounded to the nearest thousand is ....

(f) 99834 rounded to the nearest thousand is ....

2. List all the numbers which can be rounded to:

(a) 620 ....

(b) 850 ....

(c) 190 ....

(d) 1240 ....

3. While rounding to the nearest hundred, which numbers could be rounded to:

(a) 900 ....850.... to ....899.... and ....901.... to ....949....

(b) 500 .... to .... and .... to ....

(c) 2300 .... to .... and .... to ....

(d) 14600 .... to .... and .... to ....

4. While rounding to the nearest thousand, which numbers could be rounded to:

(a) 7000 ....6500.... to ....6999.... and ....7001.... to ....7499....

(b) 2000 .... to .... and .... to ....

(c) 16000 .... to .... and .... to ....

(d) 100000 .... to .... and .... to ....

5. Use the digits 8, 7 and 6 to build a number that rounds to 770.

6. Circle the number that can be rounded to the number in the box.

(a)	$\boxed{400}$	348	396	450
(b)	$\boxed{1700}$	1616	1661	1761
(c)	$\boxed{2040}$	2049	2400	2043
(d)	$\boxed{900}$	925	849	963
(e)	$\boxed{780}$	777	788	785
(f)	$\boxed{4000}$	3498	4398	4938

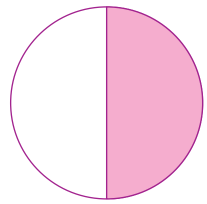
9 Fractions

We have already learnt the basic concept of fractions in Class 3. Let us review the concepts.

'Fraction' means 'a part' or 'a fragment'.

Fraction as Part of a Whole

1. Draw a circle. Divide it into 2 equal parts.



Shade a part.

The shaded part is one-half of the whole.

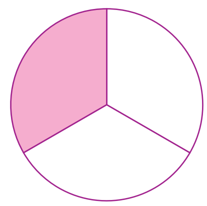
The unshaded part is also one-half of the whole.

Thus, in one-half, 1 part out of 2 equal parts is taken.

So, when an object is divided into two equal parts, then each part is called one-half of the whole.

We express one-half as $\frac{1}{2}$ and read it as 'one by two' or 'one over two'.

2. Draw another circle. Divide it into 3 equal parts.



Shade 1 part.

The shaded part is one-third of the whole.

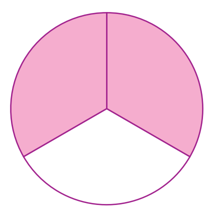
Each of the two unshaded parts is also one-third of the whole.

Thus, in one-third, 1 part out of 3 equal parts is taken.

So, when an object is divided into three equal parts, then each part is called one-third of the whole.

We express one-third as $\frac{1}{3}$ and read it as 'one by three' or 'one over three'.

3. Now, let us shade two parts out of three in the above circle.

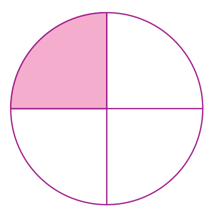


Then, the shaded part is two-thirds of the whole.

Thus, in two-thirds, 2 parts out of 3 equal parts is taken.

We express two-thirds as $\frac{2}{3}$ and read it as 'two by three' or 'two over three'.

4. Draw a circle. Divide it into 4 equal parts.



Shade 1 part.

The shaded part is one-fourth of the whole.

Thus, in one-fourth, 1 part out of 4 equal parts is taken.

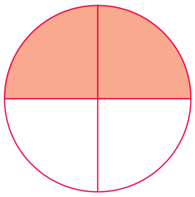
So, when an object is divided into four equal parts, then each part is called one-fourth or quarter of the whole.

We express one-fourth as $\frac{1}{4}$ and read it as 'one by four' or 'one over four.'

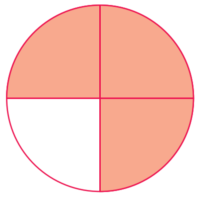
Similarly,

On shading 2 parts out of 4 equal parts, we get two-fourths or $\frac{2}{4}$.

On shading 3 parts out of 4 equal parts, we get three-fourths or $\frac{3}{4}$.



Two-fourths or $\frac{2}{4}$

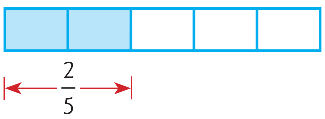


Three-fourths or $\frac{3}{4}$

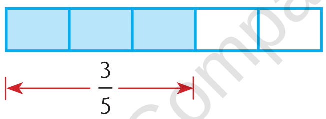
5. Draw a rectangular strip as shown.
Divide it into 5 equal parts.
Shade 1 part.

Thus, in one-fifth, 1 part out of 5 equal parts is taken. We express one-fifth as $\frac{1}{5}$.

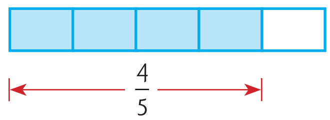
Similarly, we may define two-fifths, three-fifths and four-fifths as shown below.



Two-fifths or $\frac{2}{5}$



Three-fifths or $\frac{3}{5}$

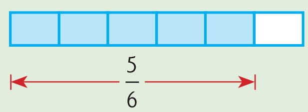
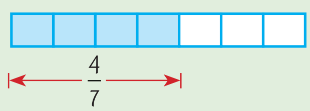
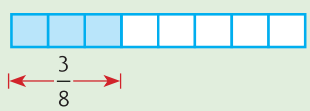
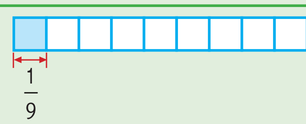


Four-fifths or $\frac{4}{5}$

Fractional Numbers and Fractions

The numbers such as one-half, one-third, two-thirds, one-fourth, two-fourths, three-fourths and two-fifths etc. are known as fractional numbers and their symbols $\frac{1}{2}, \frac{1}{3}, \frac{2}{3}, \frac{1}{4}, \frac{2}{4}, \frac{3}{4}, \frac{2}{5}$, etc. are known as fractions.

Some more examples are given below:

	Shaded Parts	Fractions	Fractional number	Figure
(a)	5 parts out of 6 equal parts	$\frac{5}{6}$	Five-sixths	
(b)	4 parts out of 7 equal parts	$\frac{4}{7}$	Four-sevenths	
(c)	3 parts out of 8 equal parts	$\frac{3}{8}$	Three-eighths	
(d)	1 part out of 9 equal parts	$\frac{1}{9}$	One-ninth	

How many halves are there in a whole?

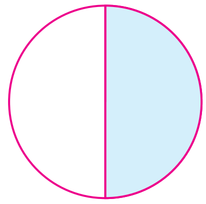
Divide a circle into 2 equal parts.

Then, each part is one-half.

$\therefore$ Two halves make a whole.

Now, 2 parts out of 2 equal parts make a whole.

$\therefore \frac{2}{2}$ = whole = 1.



2 halves or whole

How many one-thirds are there in a whole?

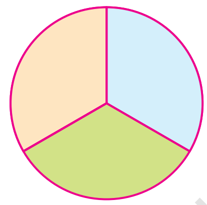
Divide a circle into three equal parts.

Then, each part is one-third.

Clearly, three-thirds make a whole.

Thus, 3 parts out of 3 equal parts make a whole.

$\therefore \frac{3}{3}$ = whole = 1.



Three-thirds or whole

How many one-fourths are there in a whole?

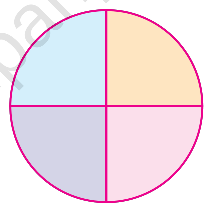
Divide a circle into 4 equal parts.

Then, each part is one-fourth.

Clearly, 4 fourths make a whole.

Thus, 4 parts out of 4 equal parts make a whole.

$\therefore \frac{4}{4}$ = whole = 1.



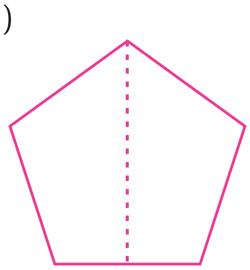
Four-fourths or whole

Thus, $\frac{2}{2} = 1, \frac{3}{3} = 1, \frac{4}{4} = 1, \frac{5}{5} = 1$ etc.

Exercise 29

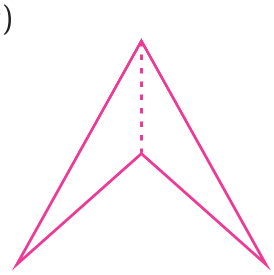
1. Shade with a pencil one-half or $\frac{1}{2}$ of each of the following figures.

(a)

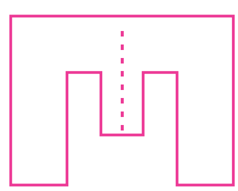


(b)

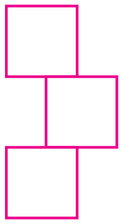
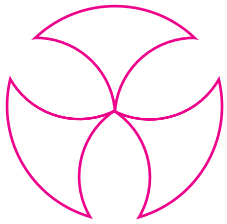
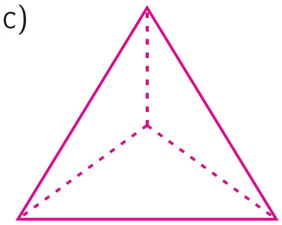
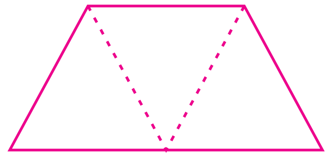
(c)



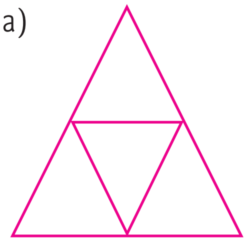
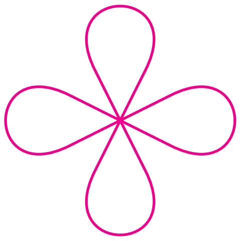
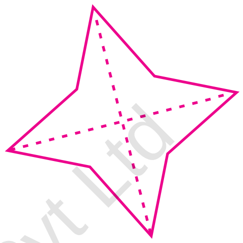
(d)



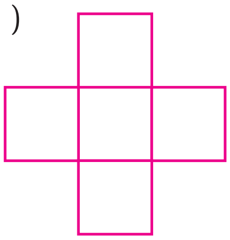
2. **Shade with a pencil one-third or $\frac{1}{3}$ of each of the following figures.**

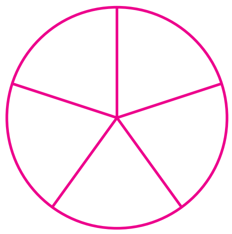
(a)

(b)

(c)

(d)


3. **Shade with a pencil three-fourths or $\frac{3}{4}$ of each of the following figures.**

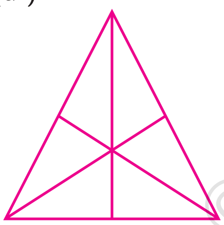
(a)

(b)

(c)


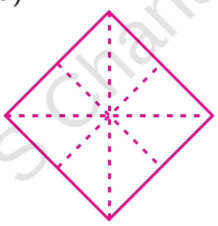
4. **Shade with a pencil two-fifths or $\frac{2}{5}$ of each of the following figures.**

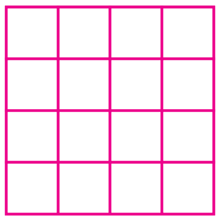
(a)

(b)

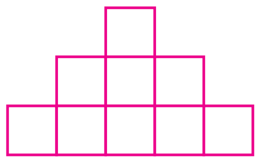
(c)


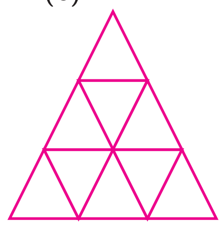
5. **Shade a part of each whole to represent the given fraction.**

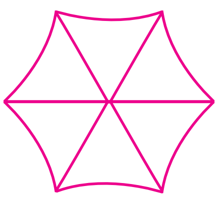
(a)

$\frac{1}{6}$

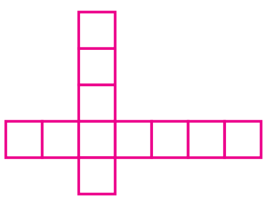
(b)

$\frac{3}{8}$

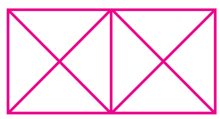
(c)

$\frac{9}{16}$

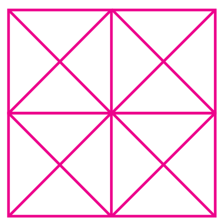
(d)

$\frac{4}{9}$

(e)

$\frac{5}{9}$

(f)

$\frac{3}{6}$

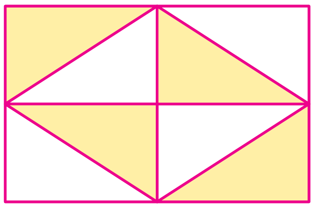
(g)

$\frac{7}{11}$

(h)

$\frac{5}{8}$

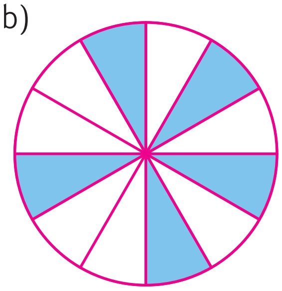
(i)

$\frac{13}{16}$

6. For each of the following figures write the fraction showing the unshaded parts.

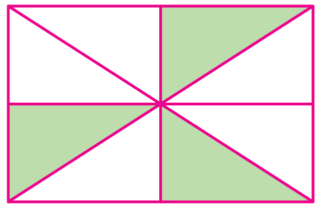
(a)



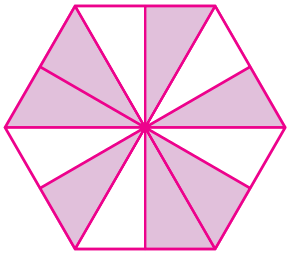
(b)



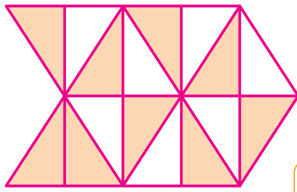
(c)



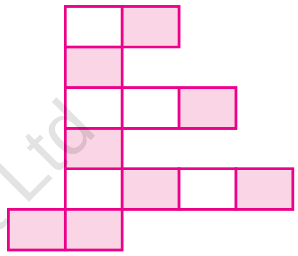
(d)



(e)



(f)



7. Write the fraction for each of the following fractional numbers. One has been done for you.

	Fractional Number	Fraction		Fractional Number	Fraction
(a)	two-fifths	$\frac{2}{5}$	(b)	one-sixth	
(c)	three-eighths		(d)	four-ninths	
(e)	five-elevenths		(f)	seven-fifteenths	
(g)	eight-seventeenths		(h)	six-thirteenths	

8. Write the fractional number for each of the following fractions. One has been done for you.

	Fraction	Fractional Number		Fraction	Fractional Number
(a)	$\frac{3}{7}$	three-sevenths	(b)	$\frac{2}{11}$	
(c)	$\frac{7}{10}$		(d)	$\frac{5}{16}$	
(e)	$\frac{9}{13}$		(f)	$\frac{11}{20}$	

Numerator and Denominator of a Fraction

A fraction is written with two numerals arranged one over the other and separated by a line.

The numeral above the line is called the numerator and the numeral below the line is called the denominator of the fraction.

In $\frac{7}{8}$, we have numerator = 7, denominator = 8.

In $\frac{1}{9}$, we have numerator = 1, denominator = 9.

In $\frac{11}{23}$, we have numerator = 11, denominator = 23.

Exercise 30

1. Write the numerator and denominator of each of the following fractions.

(a) $\frac{2}{5}$ (b) $\frac{6}{7}$ (c) $\frac{9}{13}$ (d) $\frac{8}{15}$ (e) $\frac{3}{10}$

(f) $\frac{7}{16}$ (g) $\frac{9}{19}$ (h) $\frac{11}{17}$ (i) $\frac{14}{25}$ (j) $\frac{19}{36}$

2. Write the fractions in which:

(a) numerator = 7, denominator = 9

(b) numerator = 1, denominator = 6

(c) denominator = 5, numerator = 4

(d) denominator = 11, numerator = 10

(e) numerator = 3, denominator = 6

(f) numerator = 14, denominator = 25

(g) numerator = 1, denominator = 8

(h) denominator = 30, numerator = 7

(i) denominator = 27, numerator = 14

(j) denominator = 15, numerator = 7

3. Fill in the blanks.

(a) In $\frac{12}{13}$, the .... is 13.

(b) In $\frac{9}{20}$, the .... is 9.

(c) In $\frac{15}{22}$, the numerator is ....

(d) In $\frac{17}{28}$, the denominator is ....

(e) In $\frac{11}{19}$, the .... is 11 and the .... is 19.

Fractions Represented on a Number Line

Example 1: Represent $\frac{3}{7}$ on the number line.

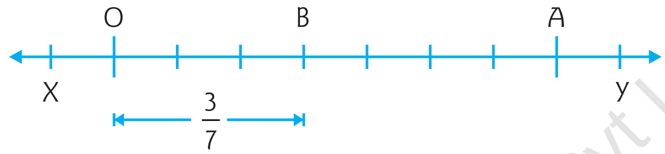
Solution: Draw a line XY.

Set off a line segment OA = 1 unit of XY.

Divide OA into 7 equal parts.

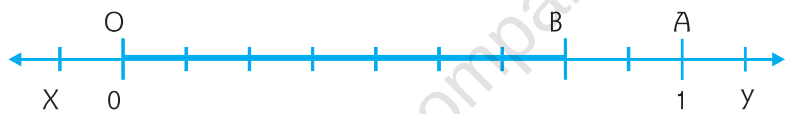
Then, each part represents $\frac{1}{7}$.

Thus, in the figure given below, the line segment OB represents the fraction $\frac{3}{7}$.



Example 2: In the figure given below XY is a line, OA is a line segment of length 1 unit.

Write the fraction represented by the line segment OB.



Solution: Clearly, OA has been divided into 9 equal parts.

By taking OB, out of 9 equal parts of a unit, 7 parts have been taken.

So, OB represents the fraction $\frac{7}{9}$.

Exercise 31

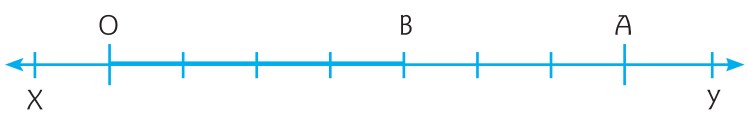
Represent each of the following fractions on the number line.

1. $\frac{1}{3}$ **2.** $\frac{2}{3}$ **3.** $\frac{4}{7}$ **4.** $\frac{7}{9}$

5. $\frac{5}{8}$ **6.** $\frac{6}{11}$ **7.** $\frac{2}{3}$ **8.** $\frac{5}{12}$

In each of the number lines given below, OA is a line segment of length 1 unit. Write the fractions represented by OB.

9.

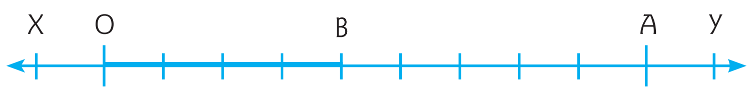


10. 

11. 

12. 

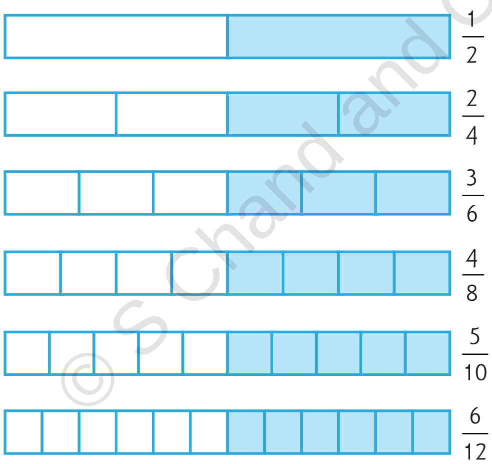
13. 

14. 

15. 

Equivalent Fractions

In each of the figures given below, the fraction represented by the shaded portion is given along with the figure.



Here, the shaded portions of these figures are equal.

So, the fractions represented by these shaded portions are also equal.

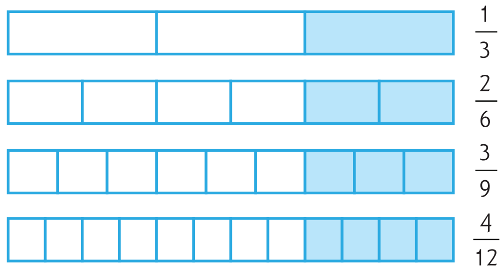
$$\therefore \frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12} \text{ etc.}$$

These fractions are called equivalent fractions, each being equal to $\frac{1}{2}$.

Note that $\frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{1 \times 3}{2 \times 3} = \frac{1 \times 4}{2 \times 4} = \frac{1 \times 5}{2 \times 5} = \frac{1 \times 6}{2 \times 6} = \ldots$etc.

Let us take another example.

In each of the figures given below, the fraction represented by the shaded portion is given along with the figure.



Here again, the shaded portions of these figures are equal.

So, the fractions represented by these shaded portions are also equal.

$$\therefore \ \frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12} \text{ etc.}$$

These fractions are called equivalent fractions, each being equal to $\frac{1}{3}$.

Note that $\frac{1}{3} = \frac{1 \times 2}{3 \times 2} = \frac{1 \times 3}{3 \times 3} = \frac{1 \times 4}{3 \times 4}$ etc.

Thus,

> To get a fraction equivalent to a given fraction, we multiply or divide the numerator and the denominator of the given fraction by the same non-zero number.

Solved Examples

Example 1: Write next three fractions equivalent to $\frac{4}{7}$.

Solution: We have:

$$\frac{4}{7} = \frac{4 \times 2}{7 \times 2} = \frac{4 \times 3}{7 \times 3} = \frac{4 \times 4}{7 \times 4}$$

$$\therefore \ \frac{4}{7} = \frac{8}{14} = \frac{12}{21} = \frac{16}{28}.$$

Hence, the fractions equivalent to $\frac{4}{7}$ are $\frac{8}{14}, \frac{12}{21}, \frac{16}{28}$.

Example 2: Write five fractions equivalent to $\frac{3}{5}$.

Solution: We have:

$$\frac{3}{5} = \frac{3 \times 2}{5 \times 2} = \frac{3 \times 3}{5 \times 3} = \frac{3 \times 4}{5 \times 4} = \frac{3 \times 5}{5 \times 5} = \frac{3 \times 6}{5 \times 6}$$

$$\therefore \ \frac{3}{5} = \frac{6}{10} = \frac{9}{15} = \frac{12}{20} = \frac{15}{25} = \frac{18}{30}.$$

Hence, the fractions equivalent to $\frac{3}{5}$ are $\frac{6}{10}, \frac{9}{15}, \frac{12}{20}, \frac{15}{25}, \frac{18}{30}$.

Finding Equivalent Fraction with given Numerator or Denominator

Example 3: **(a) Write an equivalent fraction of $\frac{2}{3}$ with numerator 8.**

(b) Write an equivalent fraction of $\frac{3}{4}$ with denominator 12.

Solution: (a) Let $\frac{2}{3} = \frac{8}{?}$.

Then, we have to find the missing numeral.

To get 8 in the numerator, we multiply 2 by 4.

$\therefore$ We multiply the denominator also by 4.

$$\therefore \frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}.$$

Hence, $\frac{2}{3}$ and $\frac{8}{12}$ are equivalent fractions.

(b) Let $\frac{3}{4} = \frac{?}{12}$.

Then, we have to find the missing numeral.

To get 12 in the denominator, we multiply 4 by 3.

$\therefore$ We multiply the numerator also by 3.

$$\therefore \frac{3}{4} = \frac{3 \times 3}{4 \times 3} = \frac{9}{12}.$$

Hence, $\frac{3}{4}$ and $\frac{9}{12}$ are equivalent fractions.

Example 4: **(a) Write an equivalent fraction of $\frac{45}{60}$ with numerator 3.**

(b) Write an equivalent fraction of $\frac{32}{40}$ with denominator 5.

Solution: (a) Let $\frac{45}{60} = \frac{3}{?}$.

Then, we have to find the missing numeral.

To get 3 in the numerator, we divide 45 by 15.

$\therefore$ We divide the denominator also by 15.

$$\therefore \frac{45}{60} = \frac{45 \div 15}{60 \div 15} = \frac{3}{4}.$$

Hence, $\frac{45}{60}$ and $\frac{3}{4}$ are equivalent fractions.

(b) Let $\frac{32}{40} = \frac{?}{5}$.

Then, we have to find the missing numeral.

To get 5 in the denominator, we divide 40 by 8.

So, we divide the numerator also by 8.

$\therefore \quad \frac{32}{40} = \frac{32 \div 8}{40 \div 8} = \frac{4}{5}$.

Hence, $\frac{32}{40}$ and $\frac{4}{5}$ are equivalent fractions.

To test whether two given fractions are equivalent or not

Consider two equivalent fractions $\frac{1}{2}$ and $\frac{2}{4}$.

Cross multiply as shown : $\frac{1}{2} \times \frac{2}{4}$.

$1 \times 4 = 4$ and $2 \times 2 = 4$.

We find that the two cross products are equal.

Thus,

> Two fractions are equivalent, if the cross products i.e.,
> (Numerator of first × Denominator of second) and
> (Denominator of first × Numerator of second) are equal.

This will be more clear from the example given below.

Example 5: Are the following fractions equivalent?

(a) $\frac{2}{3}$ and $\frac{12}{18}$ (b) $\frac{3}{7}$ and $\frac{8}{21}$

Solution:

(a) Cross multiply as shown $\frac{2}{3} \times \frac{12}{18}$

Here, $2 \times 18 = 36$ and $3 \times 12 = 36$.

Thus, the two cross products are equal.

Hence, $\frac{2}{3}$ and $\frac{12}{18}$ are equivalent fractions.

(b) Cross multiply as shown $\frac{3}{7} \times \frac{8}{21}$.

Here, $3 \times 21 = 63$.

But $7 \times 8 = 56$.

$\therefore$ $3 \times 21 \neq 7 \times 8$, i.e., the two cross products are not equal.

Hence, $\frac{3}{7}$ and $\frac{8}{21}$ are not equivalent fractions.

Exercise 32

1. Write the next four equivalent fractions.

(a) $\frac{1}{5} = \frac{2}{10} = \frac{3}{15}$ = ... = ... = ... = ...

(b) $\frac{2}{7} = \frac{4}{14} = \frac{6}{21}$ = ... = ... = ... = ...

(c) $\frac{4}{5} = \frac{8}{10} = \frac{12}{15}$ = ... = ... = ... = ...

2. Write four fractions equivalent to each of the following.

(a) $\frac{1}{4}$ (b) $\frac{2}{3}$ (c) $\frac{3}{4}$ (d) $\frac{5}{6}$ (e) $\frac{4}{9}$

(f) $\frac{3}{8}$ (g) $\frac{6}{7}$ (h) $\frac{7}{9}$ (i) $\frac{3}{10}$ (j) $\frac{8}{11}$

3. Find the missing numerals.

(a) $\frac{3}{4} = \frac{\square}{16}$ (b) $\frac{4}{5} = \frac{\square}{30}$ (c) $\frac{2}{7} = \frac{\square}{21}$ (d) $\frac{5}{8} = \frac{\square}{40}$ (e) $\frac{7}{10} = \frac{\square}{70}$

(f) $\frac{4}{9} = \frac{\square}{72}$ (g) $\frac{36}{45} = \frac{\square}{5}$ (h) $\frac{40}{56} = \frac{\square}{7}$ (i) $\frac{42}{54} = \frac{\square}{9}$

4. Find the missing numerals.

(a) $\frac{2}{5} = \frac{6}{\square}$ (b) $\frac{3}{4} = \frac{18}{\square}$ (c) $\frac{4}{5} = \frac{28}{\square}$ (d) $\frac{3}{10} = \frac{21}{\square}$ (e) $\frac{5}{7} = \frac{45}{\square}$

(f) $\frac{6}{7} = \frac{36}{\square}$ (g) $\frac{28}{42} = \frac{4}{\square}$ (h) $\frac{54}{63} = \frac{6}{\square}$ (i) $\frac{40}{56} = \frac{5}{\square}$

5. Find an equivalent fraction of $\frac{5}{9}$ with

(a) numerator 30 (b) denominator 72

(c) numerator 35 (d) denominator 81

6. Find an equivalent fraction of $\frac{48}{72}$ with

(a) numerator 2 (b) denominator 9

(c) numerator 8 (d) denominator 18

7. Change each of the following fractions into an equivalent fraction with denominator 24.

(a) $\frac{2}{3}$ (b) $\frac{3}{4}$ (c) $\frac{5}{6}$

(d) $\frac{7}{8}$ (e) $\frac{14}{48}$ (f) $\frac{15}{72}$

8. Change each of the following fractions into an equivalent fraction with numerator 18.

(a) $\frac{2}{5}$ (b) $\frac{3}{4}$ (c) $\frac{6}{7}$

(d) $\frac{9}{10}$ (e) $\frac{54}{84}$ (f) $\frac{72}{92}$

9. Which of the following fractions are equivalent?

(a) $\frac{6}{10}$ and $\frac{9}{15}$ (b) $\frac{16}{24}$ and $\frac{2}{3}$ (c) $\frac{3}{4}$ and $\frac{21}{24}$

(d) $\frac{25}{36}$ and $\frac{5}{6}$ (e) $\frac{6}{8}$ and $\frac{21}{28}$ (f) $\frac{8}{12}$ and $\frac{14}{21}$

Comparison of Fractions

Comparison of fractions having same denominator

Take four strips of the same length. Divide each one of them into 5 equal parts. Shade 1, 2, 3 and 4 parts so that the shaded portions represent $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$ and $\frac{4}{5}$ respectively, as shown below.

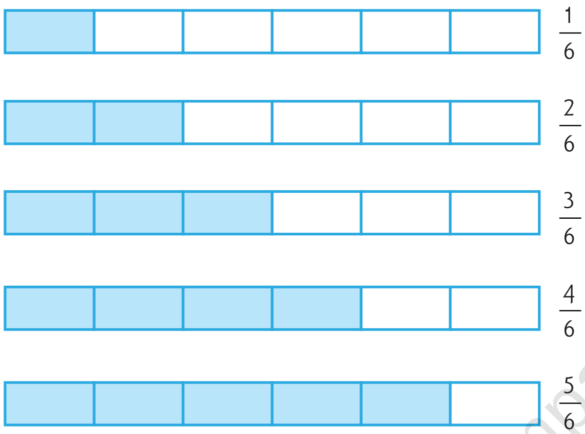
It is clear from the above figures that:

$$\frac{1}{5} < \frac{2}{5} < \frac{3}{5} < \frac{4}{5}$$

and $$\frac{4}{5} > \frac{3}{5} > \frac{2}{5} > \frac{1}{5}.$$

Now, take five strips of the same length. Divide each one of them into 6 equal parts.

Shade 1, 2, 3, 4 and 5 parts so that the shaded portions represent $\frac{1}{6}$, $\frac{2}{6}$, $\frac{3}{6}$, $\frac{4}{6}$ and $\frac{5}{6}$ respectively, as shown below.



It is clear from the above figures that:

$$\frac{1}{6} < \frac{2}{6} < \frac{3}{6} < \frac{4}{6} < \frac{5}{6}$$

and $$\frac{5}{6} > \frac{4}{6} > \frac{3}{6} > \frac{2}{6} > \frac{1}{6}.$$

Thus, we conclude:

Out of the two fractions with the same denominator, the one having smaller numerator is smaller than the other.

Thus,

If we are given a set of fractions with the same denominator, then we arrange them in ascending or descending order, according to the ascending or descending order of their numerators.

Solved Examples

Example 1: Which is smaller: $\frac{4}{7}$ or $\frac{6}{7}$?

Solution: The given fractions have the same denominator.

So, the one having a smaller numerator is smaller than the other.

Since 4 < 6, we have $\frac{4}{7} < \frac{6}{7}$.

Hence, $\frac{4}{7}$ is smaller than $\frac{6}{7}$.

Example 2: **Which is greater: $\frac{2}{9}$ or $\frac{5}{9}$?**

Solution: The given fractions have the same denominator.

So, the one having a greater numerator is greater than the other.

Since 5 > 2, we have: $\frac{5}{9} > \frac{2}{9}$.

Hence, $\frac{5}{9}$ is greater than $\frac{2}{9}$.

Example 3: **Arrange the following fractions in ascending order.**

$\frac{5}{8}, \frac{3}{8}, \frac{6}{8}, \frac{7}{8}$ and $\frac{1}{8}$.

Solution: The given fractions have the same denominator.

$\therefore$ The fraction with a smaller numerator is smaller.

Since 1 < 3 < 5 < 6 < 7, we have: $\frac{1}{8} < \frac{3}{8} < \frac{5}{8} < \frac{6}{8} < \frac{7}{8}$.

So, the given fractions in ascending order are : $\frac{1}{8}, \frac{3}{8}, \frac{5}{8}, \frac{6}{8}$ and $\frac{7}{8}$.

Example 4: **Arrange the following fractions in descending order.**

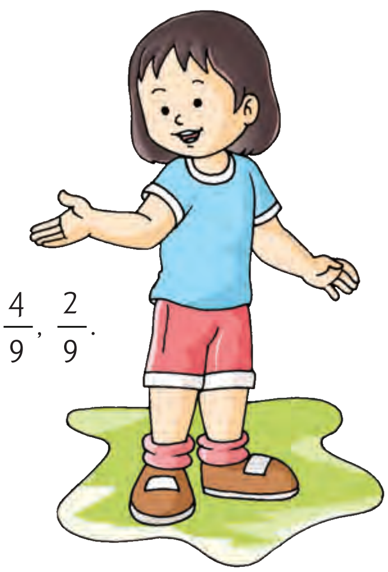
$\frac{2}{9}, \frac{5}{9}, \frac{4}{9}, \frac{7}{9}$ and $\frac{8}{9}$.

Solution: The given fractions have the same denominator.

$\therefore$ The fraction with a greater a numerator is greater.

Since 8 > 7 > 5 > 4 > 2, we have: $\frac{8}{9} > \frac{7}{9} > \frac{5}{9} > \frac{4}{9} > \frac{2}{9}$.

Hence, the given fractions in descending order are: $\frac{8}{9}, \frac{7}{9}, \frac{5}{9}, \frac{4}{9}, \frac{2}{9}$.



Exercise 33

Put the correct symbol > or < in the placeholder.

1. $\frac{4}{5} \square \frac{2}{5}$ **2.** $\frac{1}{6} \square \frac{5}{6}$ **3.** $\frac{7}{10} \square \frac{9}{10}$

4. $\frac{5}{8} \square \frac{3}{8}$ **5.** $\frac{6}{7} \square \frac{4}{7}$ **6.** $\frac{9}{11} \square \frac{6}{11}$

7. $\frac{9}{14} \square \frac{13}{14}$ **8.** $\frac{21}{25} \square \frac{8}{25}$ **9.** $\frac{23}{50} \square \frac{13}{50}$

10. Arrange the following fractions in ascending order.

(a) $\frac{7}{9}, \frac{1}{9}, \frac{4}{9}$ and $\frac{5}{9}$ (b) $\frac{7}{10}, \frac{3}{10}, \frac{6}{10}$ and $\frac{1}{10}$

(c) $\frac{4}{13}, \frac{2}{13}, \frac{9}{13}, \frac{11}{13}$ and $\frac{8}{13}$ (d) $\frac{1}{14}, \frac{9}{14}, \frac{5}{14}, \frac{11}{14}$ and $\frac{13}{14}$

11. Arrange the following fractions in descending order.

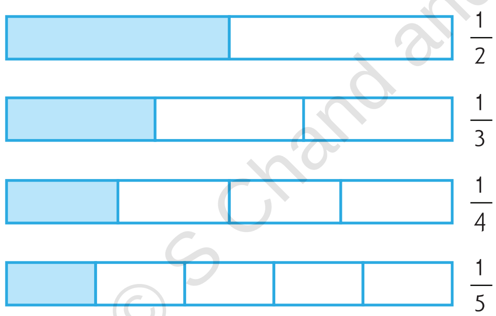
(a) $\frac{4}{7}, \frac{2}{7}, \frac{6}{7}, \frac{1}{7}$ and $\frac{3}{7}$ (b) $\frac{4}{11}, \frac{8}{11}, \frac{2}{11}, \frac{6}{11}$ and $\frac{1}{11}$

(c) $\frac{11}{15}, \frac{4}{15}, \frac{14}{15}, \frac{7}{15}$ and $\frac{13}{15}$ (d) $\frac{17}{21}, \frac{5}{21}, \frac{20}{21}, \frac{10}{21}$ and $\frac{2}{21}$

Comparison of Fractions with Same Numerator

Take some strips of the same length. Divide them into 2, 3, 4, 5 parts respectively and shade one part from each.

We find that shaded portions represent $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}$ and $\frac{1}{5}$ respectively, as shown.



Let us now compare the shaded portions.

Clearly, $\frac{1}{2} > \frac{1}{3} > \frac{1}{4} > \frac{1}{5}$.

And, $\frac{1}{5} < \frac{1}{4} < \frac{1}{3} < \frac{1}{2}$.

Thus, we conclude:

Out of the two fractions with the same numerator, the one having the smaller denominator is greater than the other.

Thus,

> If we are given a set of fractions with the same numerator, then we arrange them in ascending or descending order, according to the descending or ascending order of their denominators.

Solved Examples

Example 1: Which is smaller: $\frac{2}{5}$ or $\frac{2}{7}$?

Solution: The given fractions have the same numerator.

$\therefore$ The fraction with a larger denominator is smaller than the other.

Since 7 > 5, we have : $\frac{2}{7} < \frac{2}{5}$.

Hence, $\frac{2}{7}$ is smaller than $\frac{2}{5}$.

Example 2: Which is greater: $\frac{5}{8}$ or $\frac{5}{11}$?

Solution: The given fractions have the same numerator.

$\therefore$ The fraction with a smaller denominator is greater than the other.

Since 8 < 11, we have : $\frac{5}{8} > \frac{5}{11}$

Hence, $\frac{5}{8}$ is greater than $\frac{5}{11}$.

Example 3: Arrange the following fractions in ascending order.

$\frac{4}{11}, \frac{4}{7}, \frac{4}{9}, \frac{4}{5}$ and $\frac{4}{13}$.

Solution: The given fractions have the same numerator.

$\therefore$ The fraction with a larger denominator is smaller than the other.

Since 13 > 11 > 9 > 7 > 5, we have : $\frac{4}{13} < \frac{4}{11} < \frac{4}{9} < \frac{4}{7} < \frac{4}{5}$.

$\therefore$ Given fractions in ascending order are $\frac{4}{13}, \frac{4}{11}, \frac{4}{9}, \frac{4}{7}, \frac{4}{5}$.

Example 4: Arrange the following fractions in descending order.

$\frac{3}{5}, \frac{3}{8}, \frac{3}{10}, \frac{3}{4}$ and $\frac{3}{7}$.

Solution: The given fractions have the same numerator.

$\therefore$ The fraction with a smaller denominator is greater than the other.

Since $4 < 5 < 7 < 8 < 10$, we have:

$\frac{3}{4} > \frac{3}{5} > \frac{3}{7} > \frac{3}{8} > \frac{3}{10}$.

$\therefore$ Given fractions in descending order are: $\frac{3}{4}, \frac{3}{5}, \frac{3}{7}, \frac{3}{8}, \frac{3}{10}$.

Exercise 34

Put the correct symbol > or < in the placeholder.

1. $\frac{3}{4} \square \frac{3}{7}$ **2.** $\frac{4}{9} \square \frac{4}{7}$ **3.** $\frac{6}{8} \square \frac{6}{11}$

4. $\frac{2}{5} \square \frac{2}{9}$ **5.** $\frac{7}{10} \square \frac{7}{13}$ **6.** $\frac{8}{15} \square \frac{8}{11}$

7. $\frac{9}{19} \square \frac{9}{10}$ **8.** $\frac{6}{13} \square \frac{6}{17}$ **9.** $\frac{10}{23} \square \frac{10}{19}$

10. Arrange the following fractions in ascending order.

(a) $\frac{2}{5}, \frac{2}{7}, \frac{2}{3}$ and $\frac{2}{9}$ (b) $\frac{3}{4}, \frac{3}{7}, \frac{3}{11}, \frac{3}{5}$ and $\frac{3}{9}$ (c) $\frac{5}{11}, \frac{5}{8}, \frac{5}{7}, \frac{5}{6}$, and $\frac{5}{10}$

(d) $\frac{7}{8}, \frac{7}{11}, \frac{7}{9}, \frac{7}{13}$ and $\frac{7}{15}$ (e) $\frac{1}{5}, \frac{1}{3}, \frac{1}{7}, \frac{1}{4}$ and $\frac{1}{2}$ (f) $\frac{8}{9}, \frac{8}{11}, \frac{8}{15}, \frac{8}{13}$ and $\frac{8}{17}$

11. Arrange the following fractions in descending order.

(a) $\frac{2}{9}, \frac{2}{11}, \frac{2}{5}$ and $\frac{2}{3}$ (b) $\frac{1}{9}, \frac{1}{3}, \frac{1}{6}$ and $\frac{1}{12}$ (c) $\frac{5}{6}, \frac{5}{11}, \frac{5}{8}, \frac{5}{13}$, and $\frac{5}{9}$

(d) $\frac{4}{13}, \frac{4}{15}, \frac{9}{7}, \frac{4}{11}$ and $\frac{4}{9}$ (e) $\frac{9}{10}, \frac{9}{13}, \frac{9}{11}, \frac{9}{15}$ and $\frac{9}{17}$

Like and Unlike Fractions

Fractions with same denominators are called like fractions.

Example: $\frac{2}{9}, \frac{3}{9}, \frac{4}{9}, \frac{5}{9}$, etc. are all like fractions.

Fractions with different denominators are called unlike fractions.

Example: $\frac{1}{2}, \frac{1}{4}, \frac{3}{8}, \frac{5}{7}$, etc. are all unlike fractions.

Exercise 35

1. **Which of the following are groups of like fractions?**

   (a) $\frac{2}{5}, \frac{4}{5}$ (b) $\frac{1}{8}, \frac{3}{8}, \frac{7}{8}$ (c) $\frac{2}{7}, \frac{4}{7}, \frac{5}{7}, \frac{3}{7}, \frac{6}{7}$

   (d) $\frac{1}{6}, \frac{2}{9}, \frac{3}{5}, \frac{4}{7}, \frac{1}{3}$ (e) $\frac{1}{2}, \frac{1}{3}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{10}$ (f) $\frac{7}{9}, \frac{4}{9}, \frac{2}{9}, \frac{5}{9}, \frac{8}{9}$

2. **Which of the following are groups of unlike fractions?**

   (a) $\frac{1}{6}, \frac{5}{6}, \frac{6}{6}, \frac{3}{6}$ (b) $\frac{1}{2}, \frac{3}{4}, \frac{5}{6}, \frac{6}{7}, \frac{9}{10}$ (c) $\frac{4}{9}, \frac{2}{9}, \frac{5}{9}, \frac{7}{9}, \frac{3}{9}$ (d) $\frac{5}{4}, \frac{7}{8}, \frac{6}{11}, \frac{5}{7}$

3. **Write three like fractions with**

   (a) denominator 8 (b) denominator 11 (c) denominator 14

Addition of Like Fractions

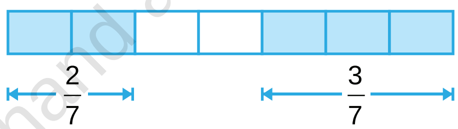
Let us see how we add $\frac{2}{7}$ and $\frac{3}{7}$.

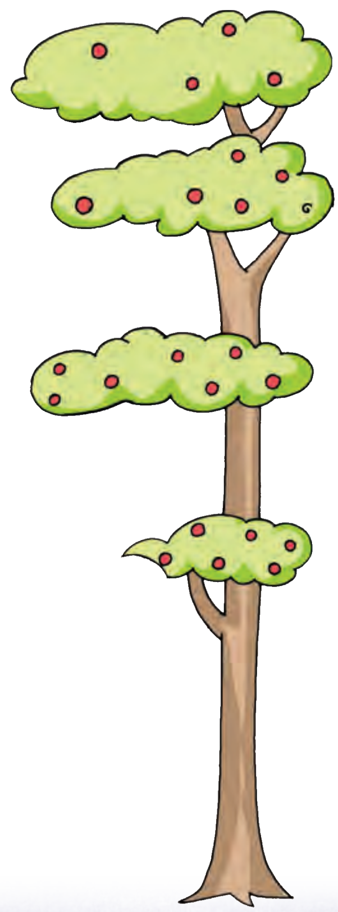
Take a strip of paper.

Divide it into 7 equal parts.

Then, each part represents $\frac{1}{7}$ of the whole.

Shade 2 parts on the left and 3 parts on the right, as shown below.





2 shaded parts on the left + 3 shaded parts on the right = 5 shaded parts.

$\therefore \quad \frac{2}{7} + \frac{3}{7} = \frac{5}{7}$ [since each shaded part represents $\frac{1}{7}$]

Note that : $\frac{2}{7} + \frac{3}{7} = \frac{2+3}{7}$.

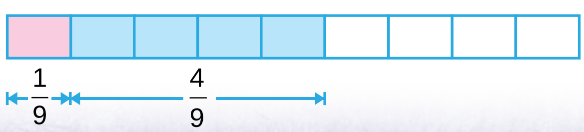
Take up another example of adding $\frac{1}{9}$ and $\frac{4}{9}$.

Take a strip of paper.

Divide it into 9 equal parts.

Then, each part represents $\frac{1}{9}$ of the whole.

Let us shade 1 part and 4 parts in different colours, as shown below.



1 shaded part + 4 shaded parts = 5 shaded parts.

$\therefore\ \frac{1}{9} + \frac{4}{9} = \frac{5}{9}$ [since each shaded part represents $\frac{1}{9}$]

Note that: $\frac{1}{9} + \frac{4}{9} = \frac{1+4}{9}$.

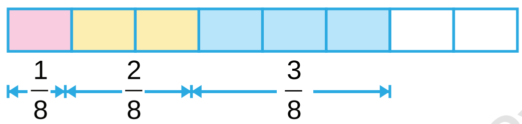
Similarly, we can add three fractions, say $\frac{1}{8}$, $\frac{2}{8}$ and $\frac{3}{8}$.

Take a strip of paper.

Divide it into 8 equal parts.

Then, each part represents $\frac{1}{8}$ of the whole.

Let us shade 1 part, 2 parts and 3 parts in three different manners, as shown below.



1 shaded part + 2 shaded parts + 3 shaded parts = 6 shaded parts.

$\therefore\ \frac{1}{8} + \frac{2}{8} + \frac{3}{8} = \frac{6}{8}$ [since each shaded part represents $\frac{1}{8}$]

Note that : $\frac{1}{8} + \frac{2}{8} + \frac{3}{8} = \frac{1+2+3}{8}$.

Thus, we conclude:

$$\text{Sum of two or more like fractions} = \frac{\text{Sum of the numerators}}{\text{Common denominator}}$$

Solved Examples

Example 1: Find the sum: $\frac{1}{5} + \frac{2}{5}$.

Solution: Both the fractions have the same denominator.

$\frac{1}{5} + \frac{2}{5} = \frac{1+2}{5} = \frac{3}{5}$.

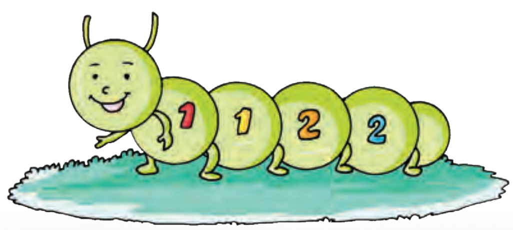
Hence, the sum of the given fractions is $\frac{3}{5}$.

Example 2: Find the sum: $\frac{5}{13} + \frac{2}{13} + \frac{4}{13}$.

Solution: All the given fractions have the same denominator.

$\therefore\ \frac{5}{13} + \frac{2}{13} + \frac{4}{13} = \frac{5+2+4}{13} = \frac{11}{13}$.

Hence, the sum of the given fractions is $\frac{11}{13}$.



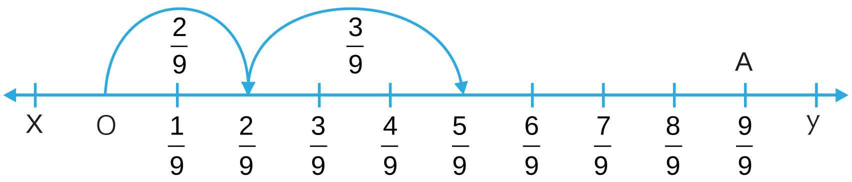
Example 3: Add $\frac{2}{9}$ and $\frac{3}{9}$ using number line.

Solution: On a line, take line segment OA. Suppose length OA = 1 unit.

Divide OA into 9 equal parts.

Then, each part represents $\frac{1}{9}$ of the whole.

Starting with the point O, first move by 2 steps and then move by 3 steps, as shown below.



Here, 2 steps + 3 steps = 5 steps

$\therefore \quad \frac{2}{9} + \frac{3}{9} = \frac{5}{9}.$

Example 4: Add $\frac{3}{7}, \frac{2}{7}$ and $\frac{1}{7}$ using number line.

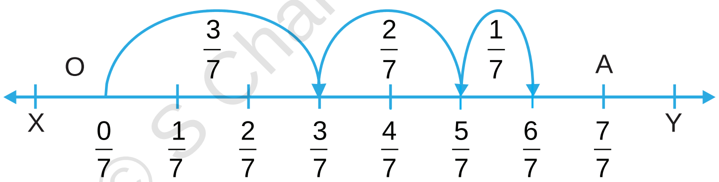
Solution: Draw a line XY.

Set off a line segment OA of length 1 unit.

Divide OA into 7 equal parts.

Then, each part represents $\frac{1}{7}$ of the whole.

Starting with the point O, first move formed by 3 steps, then by 2 steps and finally by 1 step, as shown below.

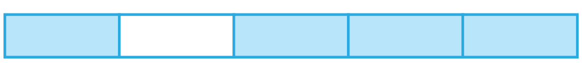


$\therefore$ 3 steps + 2 steps + 1 step = 6 steps.

or $\frac{3}{7} + \frac{2}{7} + \frac{1}{7} = \frac{6}{7}$ [since each part represents $\frac{1}{7}$]

Exercise 36

With the help of figures, fill in the placeholders.

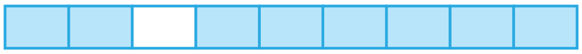
1. 

$\frac{1}{5} + \frac{3}{5} = \frac{\boxed{} + \boxed{}}{5} = \frac{\boxed{}}{5}$

2. 

$\frac{2}{6} + \frac{3}{6} = \frac{\boxed{} + \boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$

3.  $\frac{3}{10} + \frac{4}{10} = \frac{\boxed{} + \boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$

4.  $\frac{2}{9} + \frac{6}{9} = \frac{2+6}{\boxed{}} = \frac{8}{\boxed{}}$

5.  $\frac{2}{11} + \frac{1}{11} + \frac{4}{11} = \frac{\boxed{} + \boxed{} + \boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$

Find the sum.

6. $\frac{1}{6} + \frac{3}{6}$

7. $\frac{1}{7} + \frac{4}{7}$

8. $\frac{3}{8} + \frac{4}{8}$

9. $\frac{2}{4} + \frac{1}{4}$

10. $\frac{4}{9} + \frac{2}{9}$

11. $\frac{3}{10} + \frac{4}{10}$

12. $\frac{5}{11} + \frac{3}{11} + \frac{2}{11}$

13. $\frac{4}{15} + \frac{7}{15} + \frac{2}{15}$

14. $\frac{7}{20} + \frac{3}{20} + \frac{5}{20}$

Add:

15. $\frac{8}{11}$ and $\frac{2}{11}$

16. $\frac{9}{16}$ and $\frac{5}{16}$

17. $\frac{5}{14}$ and $\frac{3}{14}$

18. $\frac{2}{6}$ and $\frac{3}{6}$

19. $\frac{4}{11}$ and $\frac{5}{11}$

20. $\frac{1}{10}$, $\frac{3}{10}$ and $\frac{4}{10}$

21. $\frac{2}{12}$, $\frac{3}{12}$ and $\frac{5}{12}$

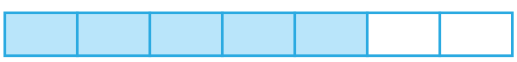
Subtraction of Like Fractions

Let us see how we subtract $\frac{2}{7}$ from $\frac{5}{7}$.

Take a strip of paper.

Divide it into 7 equal parts.

Here, each part represents $\frac{1}{7}$ of the whole.

Shade 5 parts. 

Out of the 5 shaded parts, remove 2 parts, as shown 

So, 3 shaded parts remain there.

5 shaded parts – 2 shaded parts = 3 shaded parts.

$\therefore \frac{5}{7} - \frac{2}{7} = \frac{3}{7}$.

Note that : $\frac{5}{7} - \frac{2}{7} = \frac{5-2}{7}$.

Thus, we conclude:

Difference between two like fractions = $\frac{\text{Difference between the numerators}}{\text{Common denominator}}$

Solved Examples

Example 1: Subtract $\frac{4}{9}$ from $\frac{7}{9}$.

Solution: Both of the given fractions have the same denominator.

$\therefore \quad \frac{7}{9} - \frac{4}{9} = \frac{7-4}{9} = \frac{3}{9}$.

Example 2: Find the difference between $\frac{3}{8}$ and $\frac{5}{8}$.

Solution: Both the fractions have the same denominator.

And, 5 > 3, so we have:

$\frac{5}{8} > \frac{3}{8}$.

$\therefore \quad \frac{5}{8} - \frac{3}{8} = \frac{5-3}{8} = \frac{2}{8}$.

Example 3: Find the difference $\frac{7}{10} - \frac{3}{10}$ using number line.

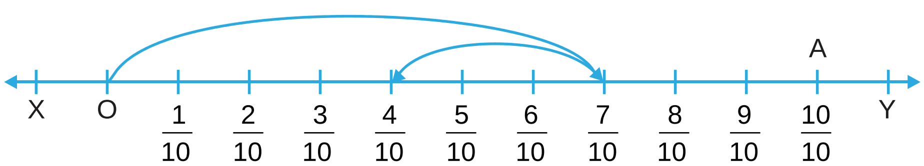
Solution: Draw line XY.

Set off a line segment OA of length 1 unit on the line.

Divide OA into 10 equal parts.

Here, each part represents $\frac{1}{10}$ of the whole.

Starting from O, move forward by 7 steps and then move back by 3 steps, as shown.



Clearly, 7 steps – 3 steps = 4 steps.

$\therefore \quad \frac{7}{10} - \frac{3}{10} = \frac{4}{10}$.

Exercise 37

Find the difference.

1. $\frac{7}{8} - \frac{3}{8}$ **2.** $\frac{5}{6} - \frac{1}{6}$ **3.** $\frac{4}{7} - \frac{3}{7}$ **4.** $\frac{8}{9} - \frac{5}{9}$ **5.** $\frac{6}{7} - \frac{4}{7}$

6. $\frac{5}{10} - \frac{3}{10}$ **7.** $\frac{11}{15} - \frac{4}{15}$ **8.** $\frac{12}{17} - \frac{8}{17}$ **9.** $\frac{13}{20} - \frac{7}{20}$

Subtract:

10. $\frac{1}{5}$ from $\frac{3}{5}$ **11.** $\frac{2}{7}$ from $\frac{6}{7}$ **12.** $\frac{1}{8}$ from $\frac{5}{8}$

Find the difference between:

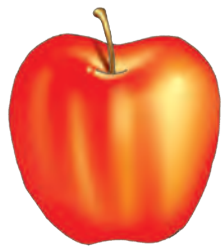
13. $\frac{9}{13}$ and $\frac{4}{13}$ **14.** $\frac{5}{10}$ and $\frac{8}{10}$

Use number line to find the difference:

15. $\frac{5}{7} - \frac{3}{7}$ **16.** $\frac{8}{11} - \frac{5}{11}$

Fraction as Division

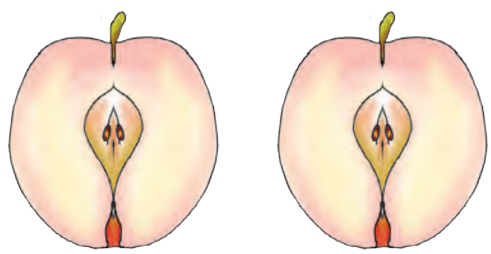
Suppose an apple is to be shared between 2 children equally.



We know that division means 'equal sharing'.

By the concept of division, one apple will be divided into 2 parts and each child will get (1 ÷ 2) apple.

By the concept of fractions, we shall divide the whole apple into 2 equal halves and each child will get $\frac{1}{2}$ apple.



Comparing the two results, we get: $1 \div 2 = \frac{1}{2}$.

In general, we may say: $a \div b = \frac{a}{b}$.

Thus, $\frac{5}{6} = 5 \div 6$, $\frac{3}{4} = 3 \div 4$, etc.

Also, $\frac{5}{5} = 5 \div 5 = 1$, $\frac{6}{6} = 6 \div 6 = 1$, $\frac{7}{7} = 7 \div 7 = 1$, and so on.

Numerals as Fractions

We already know that when we divide a number by 1, the result is the number itself.

Thus, $6 \div 1 = 6$; $4 \div 1 = 4$; $3 \div 1 = 3$, and so on.

Also, as discussed above, $6 \div 1 = \frac{6}{1}$, $4 \div 1 = \frac{4}{1}$, $3 \div 1 = \frac{3}{1}$ and so on.

So, we can say that : $6 = \frac{6}{1}$, $4 = \frac{4}{1}$, $3 = \frac{3}{1}$, ...

Hence, every numeral can be expressed as a fraction with that numeral as numerator and 1 as denominator.

Unit Fractions

Fractions with numerator 1 are called unit fractions.

Examples: $\frac{1}{1}, \frac{1}{2}, \frac{1}{3}, \frac{1}{7}, \frac{1}{10}, \frac{1}{16}$ etc. are all unit fractions.

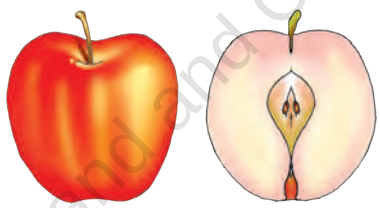
Proper and Improper Fractions

Proper Fractions

A fraction whose numerator is less than its denominator is called a proper fraction.

Examples : $\frac{3}{4}, \frac{5}{7}, \frac{6}{11}, \frac{14}{19}, \frac{20}{27}$ etc. are all proper fractions.

Improper Fractions



Suppose out of 2 apples, a boy eats one full apple and one half apple.

Then, we say that the boy has eaten (one whole and one half apple).

But, one whole = two halves.

So, number of apples eaten by the boy $= 1 + \frac{1}{2} = \left(\frac{1}{2} + \frac{1}{2}\right) + \frac{1}{2}$

$$= \frac{(1 + 1 + 1)}{2} = \frac{3}{2}.$$

Thus, the boy ate $\frac{3}{2}$ apples.

A fraction whose numerator is greater than or equal to its denominator, is called an improper fraction.

Examples: $\frac{5}{4}, \frac{7}{5}, \frac{7}{7}, \frac{8}{3}, \frac{11}{6}$, etc. are all improper fractions.

Mixed Numbers

As discussed above, $\frac{3}{2} = 1 + \frac{1}{2}$.

We write : $1 + \frac{1}{2}$ as $1\frac{1}{2}$.

So, $\frac{3}{2} = 1\frac{1}{2}$.

When an improper fraction is written as a combination of a whole number and a proper fraction, it is called a mixed number.

To convert a mixed numeral into an improper fraction

Consider the numeral $2\frac{1}{2}$.

$2\frac{1}{2}$ chocolates means 2 chocolates + $\frac{1}{2}$ chocolate.

Mixed numeral, $2\frac{1}{2} = 2 + \frac{1}{2}$

$= \frac{2}{1} + \frac{1}{2} = \frac{2 \times 2}{1 \times 2} + \frac{1}{2}$

$= \frac{4}{2} + \frac{1}{2} = \frac{4+1}{2} = \frac{5}{2}$ (Improper fraction)

Similarly, we have:

$3\frac{1}{4} = 3 + \frac{1}{4}$

$= \frac{3}{1} + \frac{1}{4} = \frac{3 \times 4}{1 \times 4} + \frac{1}{4}$

$= \frac{12}{1} + \frac{1}{4} = \frac{12+1}{4} = \frac{13}{4}$.

$4\frac{6}{7} = 4 + \frac{6}{7}$

$= \frac{4}{1} + \frac{6}{7} = \frac{4 \times 7}{1 \times 7} + \frac{6}{7}$

$= \frac{28}{7} + \frac{6}{7} = \frac{28+6}{7} = \frac{34}{7}$.

Short-cut Method for Converting a Mixed Numeral into Improper Fraction

We know that: Mixed Numeral = A Whole Number + Fractional Part

To change a mixed numeral into an improper fraction, we multiply the whole number by the denominator of the fractional part and add to the product the numerator of the fractional part.

This gives the numerator of the required improper fraction.

Its denominator will be the same as that of the fractional part.

Thus, we have:

$$2\frac{1}{2} = \frac{2 \times 2 + 1}{2} = \frac{4 + 1}{2} = \frac{5}{2}; \qquad 3\frac{1}{4} = \frac{3 \times 4 + 1}{4} = \frac{12 + 1}{4} = \frac{13}{4};$$

$$4\frac{6}{7} = \frac{4 \times 7 + 6}{7} = \frac{28 + 6}{7} = \frac{34}{7}; \qquad 1\frac{2}{3} = \frac{1 \times 3 + 2}{3} = \frac{3 + 2}{3} = \frac{5}{3};$$

Solved Examples

Example 1: Convert each of the following mixed numerals into an improper fraction.

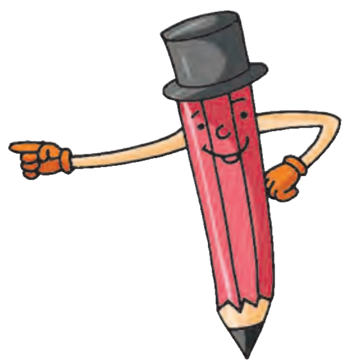
(a) $4\frac{3}{5}$ (b) $3\frac{5}{8}$ (c) $5\frac{2}{9}$

Solution: We have:

(a) $4\frac{3}{5} = \frac{4 \times 5 + 3}{5} = \frac{20 + 3}{5} = \frac{23}{5}$.

(b) $3\frac{5}{8} = \frac{3 \times 8 + 5}{8} = \frac{24 + 5}{8} = \frac{29}{8}$.

(c) $5\frac{2}{9} = \frac{5 \times 9 + 2}{9} = \frac{45 + 2}{9} = \frac{47}{9}$.



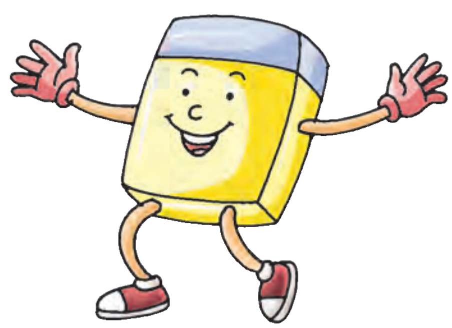
To convert an improper fraction into a mixed numeral

Consider the improper fraction $\frac{7}{5}$.

We have:

$$\frac{7}{5} = \left(\frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}\right) + \frac{1}{5} + \frac{1}{5}$$

$$= \frac{5}{5} + \frac{2}{5} = 1 + \frac{2}{5} = 1\frac{2}{5}.$$



Shorter Method:

Let us convert $\frac{7}{5}$ into mixed numeral by a shorter method:

On dividing 7 by 5, we get :

quotient = 1, remainder = 2.

That is, 1 whole number and 2 parts out of 5.

That is, 1 whole number and $\frac{2}{5}$.

$\therefore \ \frac{7}{5} = 1 + \frac{2}{5} = 1\frac{2}{5}$.

$$\begin{array}{r} 1 \\ 5\overline{)\,7} \\ -\,5 \\ \hline 2 \\ \hline \end{array}$$

Example 2: Convert the following improper fractions into mixed numerals.

(a) $\frac{21}{8}$ (b) $\frac{43}{7}$ (c) $\frac{103}{9}$

Solution : (a) On dividing 21 by 8, we get:

quotient = 2, remainder = 5.

That is, 2 whole numbers + 5 parts out of 8.

$\therefore \ \frac{21}{8} = 2 + \frac{5}{8} = 2\frac{5}{8}$.

$$\begin{array}{r} 2 \\ 8\overline{)\,21} \\ -\,16 \\ \hline 5 \\ \hline \end{array}$$

(b) On dividing 43 by 7, we get:

quotient = 6, remainder = 1.

That is, 6 whole numbers + 1 part out of 7.

$\therefore \ \frac{43}{7} = 6 + \frac{1}{7} = 6\frac{1}{7}$.

$$\begin{array}{r} 6 \\ 7\overline{)\,43} \\ -\,42 \\ \hline 1 \\ \hline \end{array}$$

(c) On dividing 103 by 9, we get:

quotient = 11, remainder = 4.

That is, 11 whole numbers + 4 parts out of 9.

$\therefore \ \frac{103}{9} = 11 + \frac{4}{9} = 11\frac{4}{9}$.

$$\begin{array}{r} 11 \\ 9\overline{)\,103} \\ -\,9 \\ \hline 13 \\ -\,9 \\ \hline 4 \\ \hline \end{array}$$

Exercise 38

1. Write each of the following divisions as a fraction.

(a) 8 ÷ 4 (b) 30 ÷ 5 (c) 48 ÷ 8 (d) 27 ÷ 9

(e) 66 ÷ 11 (f) 72 ÷ 24 (g) 96 ÷ 16 (h) 100 ÷ 50

2. **Write each of the following fractions as a division.**

(a) $\frac{2}{7}$ (b) $\frac{5}{9}$ (c) $\frac{13}{17}$ (d) $\frac{80}{25}$

(e) $\frac{36}{67}$ (f) $\frac{42}{83}$ (g) $\frac{9}{16}$ (h) $\frac{45}{128}$

3. **Which of the following are proper fractions?**

(a) $\frac{2}{7}$ (b) $\frac{8}{8}$ (c) $\frac{10}{3}$ (d) $\frac{69}{70}$

(e) $\frac{19}{29}$ (f) $\frac{20}{17}$ (g) $\frac{25}{30}$ (h) $\frac{18}{19}$

4. **Which of the following are improper fractions?**

(a) $\frac{10}{3}$ (b) $\frac{11}{7}$ (c) $\frac{7}{7}$ (d) $\frac{8}{23}$

(e) $\frac{29}{6}$ (f) $\frac{9}{3}$ (g) $\frac{71}{70}$ (h) $\frac{5}{6}$

5. **Which of the following are unit fractions?**

(a) $\frac{1}{7}$ (b) $\frac{2}{6}$ (c) $\frac{1}{4}$ (d) $\frac{5}{1}$

(e) $\frac{1}{9}$ (f) $\frac{6}{6}$ (g) $\frac{1}{1}$ (h) $\frac{1}{10}$

6. Are all unit fractions proper fractions? If your answer is 'No', give an example of a unit fraction which is an improper fraction.

7. **Convert the following mixed numerals into improper fractions.**

(a) $2\frac{3}{7}$ (b) $4\frac{3}{8}$ (c) $7\frac{1}{7}$ (d) $6\frac{5}{9}$

(e) $1\frac{1}{11}$ (f) $2\frac{11}{12}$ (g) $9\frac{3}{10}$ (h) $1\frac{9}{17}$

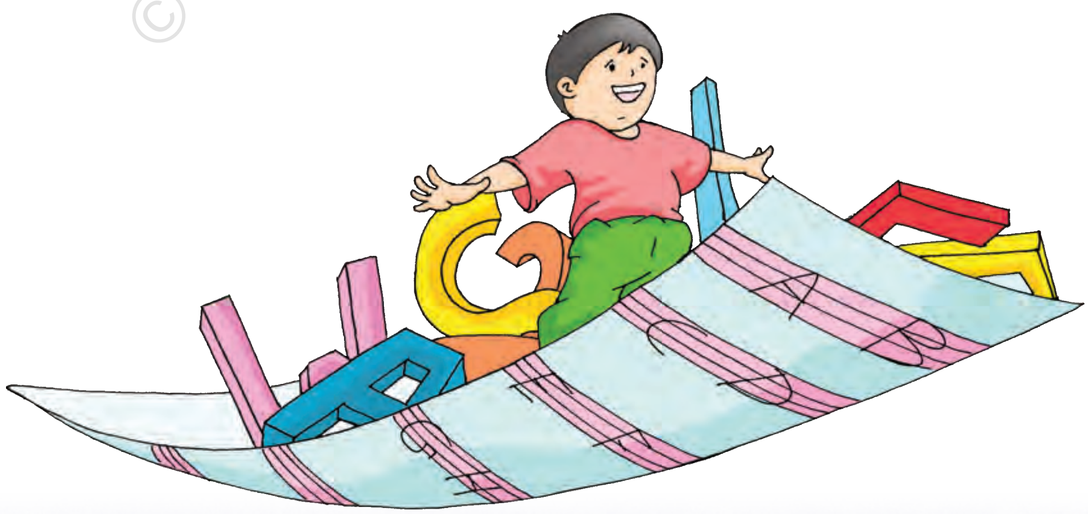
8. **Convert the following improper fractions into mixed numerals.**

(a) $\frac{14}{5}$ (b) $\frac{18}{7}$ (c) $\frac{27}{6}$ (d) $\frac{35}{8}$

(e) $\frac{100}{9}$ (f) $\frac{51}{4}$ (g) $\frac{87}{10}$ (h) $\frac{106}{11}$

Things to Remember

1. A fraction indicates one or more parts of a whole.
2. The numbers like one-half, one-third, two-thirds, three-fourths, two-fifths etc. are called fractional numbers and the symbols $\frac{1}{2}, \frac{1}{3}, \frac{2}{3}, \frac{3}{4}, \frac{2}{5}$ etc. representing them are called fractions.
3. A fraction obtained by multiplying or dividing the numerator and denominator by the same non-zero number is called an equivalent fraction of the given fraction.
4. If we compare two fractions with same denominators, then the one with greater numerator is greater.
5. If we compare two fractions with same numerators, then the one with smaller denominator is greater.
6. Fractions with same denominators are called like fractions.
7. Fractions with different denominators are called unlike fractions.
8. Sum of two or more like fractions = $\frac{\text{Sum of the numerators}}{\text{Common denominator}}$.
9. Difference between two like fractions = $\frac{\text{Difference between the numerators}}{\text{Common denominator}}$.
10. A fraction with numerator less than its denominator is called a proper fraction.
11. A fraction with numerator greater than or equal to its denominator is called an improper fraction.
12. Fractions with 1 as numerator are called unit fractions.

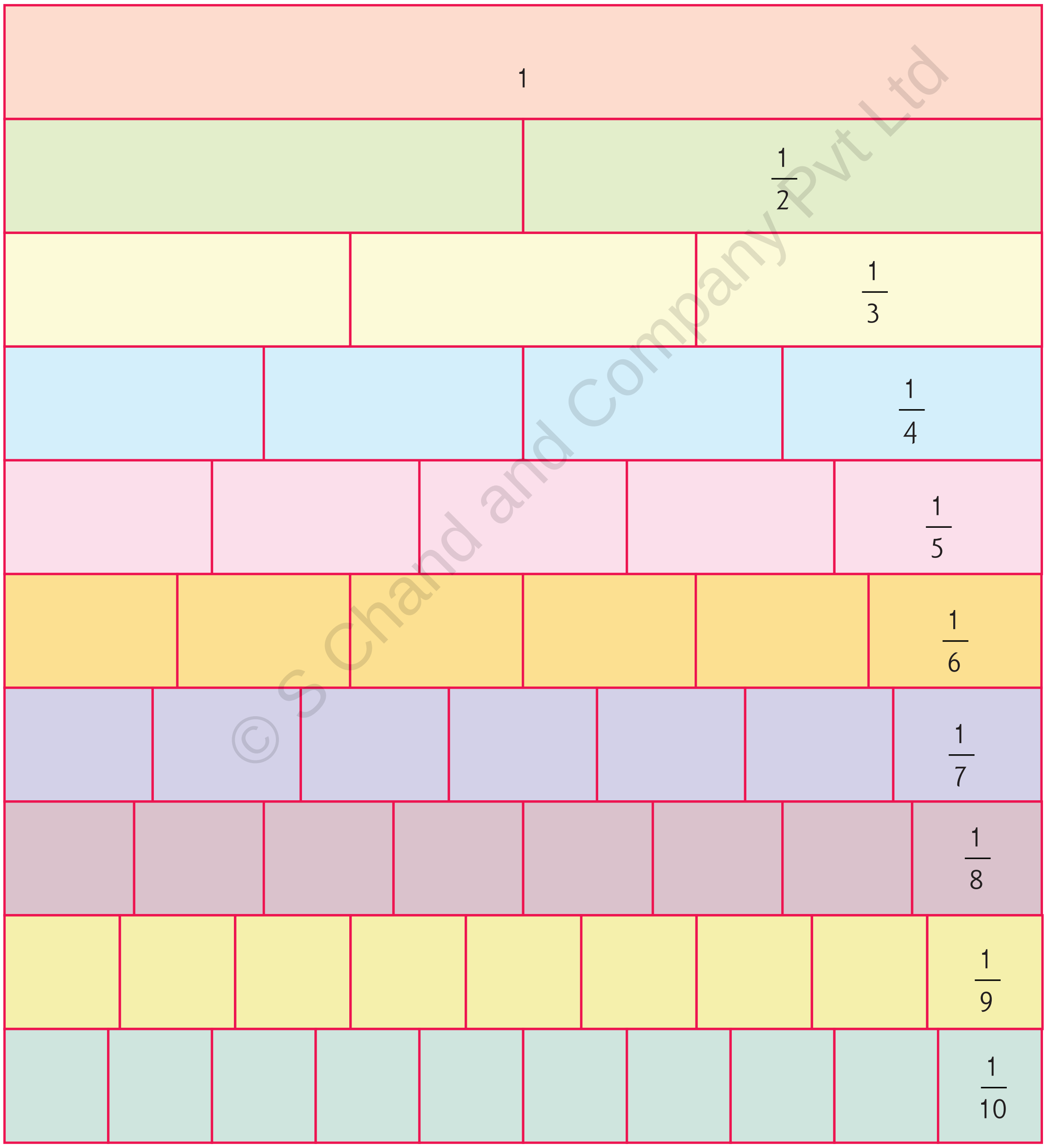


Activity Time

Activity 1

Let us make a fraction chart that shall help us to compare fractions.

On a plane sheet of paper, draw a square of side 10 cm. Take coloured origami sheets. Cut out 10 strips (of different colours) each 10 cm long and 1 cm wide. Paste these strips in the square one below the other. Divide the second strip into 2 equal parts, third strip into 3 equal parts, and so on, as shown below to form a fraction chart.



From the above chart it is clear that

$$1 > \frac{1}{2} > \frac{1}{3} > \frac{1}{4} > \frac{1}{5} > \frac{1}{6} > \frac{1}{7} > \frac{1}{8} > \frac{1}{9} > \frac{1}{10}$$

This verifies the rule of comparison of fractions with same numerator.

You can also use the chart to answer the following questions:

1. How many halves make 1 whole? ....

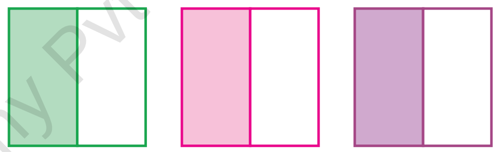
2. How many one-fourths make 1 whole? ....

3. How many one-fifths make 1 whole? ....

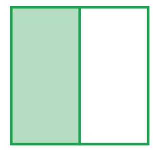
4. How many one-sevenths make 1 whole? ....

Activity 2

Cut out three square cardboard pieces of the same size. In each square draw a vertical line in the middle and shade 1 part.

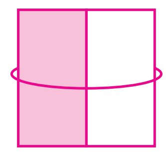


1. Clearly, the shaded part in one square represents $\frac{1}{2}$.

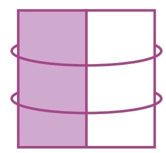


2. Take one of the squares and put a rubber band around its centre horizontally as shown.

Clearly, in this square, the shaded part is 2 parts out of 4 equal parts i.e. it represents the fraction $\frac{2}{4}$.



3. In the third square, put two rubber bands at equal gaps horizontally as shown.

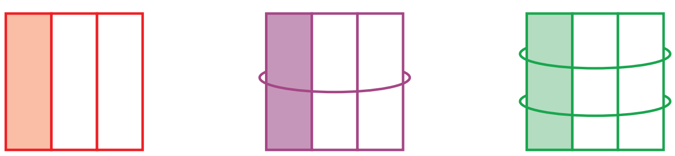


Clearly, in this square, the shaded part is 3 parts out of 6 equal parts i.e., it represents the fraction $\frac{3}{6}$.

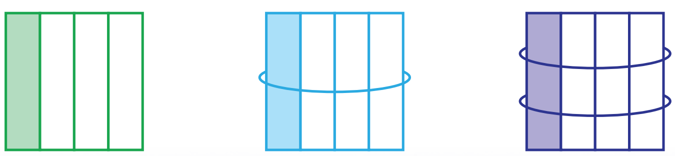
Thus, we conclude that: $\frac{1}{2} = \frac{2}{4} = \frac{3}{6}$.

You can use fresh cardboard pieces as shown to verify that:

(a) $\frac{1}{3} = \frac{2}{6} = \frac{3}{9}$



(b) $\frac{1}{4} = \frac{2}{8} = \frac{3}{12}$



C.C.E. Drill 7

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. A sack contains 53 red and white balls. Of these, 17 balls are red. What is the fraction of white balls in the sack?

(a) $\frac{17}{53}$ ☐ (b) $\frac{26}{53}$ ☐ (c) $\frac{36}{53}$ ☐ (d) $\frac{17}{36}$ ☐

2. The teacher wrote the word TELEPHONE on the blackboard. What fraction of the letters are vowels?

(a) $\frac{4}{9}$ ☐ (b) $\frac{3}{10}$ ☐ (c) $\frac{4}{10}$ ☐ (d) $\frac{3}{9}$ ☐

3. $\frac{1}{6}$ and $\frac{1}{9}$ are

(a) unit fractions ☐ (b) proper fractions ☐

(c) unlike fractions ☐ (d) All of these ☐

4. $\frac{7}{7}$ is a

(a) proper fraction ☐ (b) unit fraction ☐

(c) improper fraction ☐ (d) Both (b) and (c) ☐

5. The first three equivalent fractions of $\frac{3}{10}$ are

(a) $\frac{6}{20}, \frac{9}{30}, \frac{12}{42}$ ☐ (b) $\frac{6}{10}, \frac{9}{10}, \frac{12}{12}$ ☐ (c) $\frac{6}{20}, \frac{9}{30}, \frac{12}{40}$ ☐ (d) None of these ☐

6. Which of the following is a pair of equivalent fractions?

(a) $\frac{3}{7}$ and $\frac{10}{35}$ ☐ (b) $\frac{9}{16}$ and $\frac{27}{48}$ ☐ (c) $\frac{5}{8}$ and $\frac{30}{40}$ ☐ (d) $\frac{6}{11}$ and $\frac{66}{110}$ ☐

7. $\frac{1}{9}$ is not equivalent to

(a) $\frac{6}{54}$ ☐ (b) $\frac{10}{90}$ ☐ (c) $\frac{3}{18}$ ☐ (d) $\frac{8}{72}$ ☐

8. The equivalent fraction of $\frac{4}{7}$ with numerator 20 is

(a) $\frac{20}{30}$ ▢ (b) $\frac{20}{21}$ ▢ (c) $\frac{20}{28}$ ▢ (d) $\frac{20}{35}$ ▢

9. The fraction equivalent to $\frac{1}{3}$ is

(a) $\frac{2}{4}$ ▢ (b) $\frac{3}{6}$ ▢ (c) $\frac{4}{9}$ ▢ (d) $\frac{6}{18}$ ▢

10. Which of the following is an improper fraction?

(a) $\frac{2}{5}$ ▢ (b) $\frac{23}{21}$ ▢ (c) $\frac{1}{2}$ ▢ (d) $\frac{11}{14}$ ▢

11. Which of the following statements is correct?

(a) $6\frac{3}{7} = \frac{7 \times 3 + 6}{5} = \frac{27}{7}$ ▢ (b) $\frac{9}{13} = \frac{9+5}{13+5} = \frac{14}{18}$ ▢

(c) $\frac{3}{7} + \frac{3}{8} = \frac{3}{7+8} = \frac{3}{15}$ ▢ (d) $\frac{18}{81} = \frac{18 \div 9}{81 \div 9} = \frac{2}{9}$ ▢

12. Which of the following fractions is the greatest?

(a) $\frac{5}{6}$ ▢ (b) $\frac{5}{12}$ ▢ (c) $\frac{5}{7}$ ▢ (d) $\frac{5}{18}$ ▢

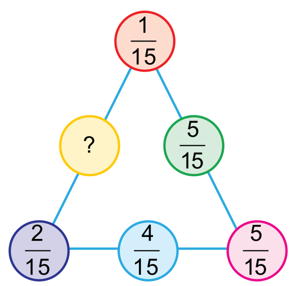
13. $\frac{8}{13} - \frac{7}{13} + \frac{1}{13} = ?$

(a) $\frac{2}{13}$ ▢ (b) $\frac{1}{13}$ ▢ (c) $\frac{16}{13}$ ▢ (d) $\frac{14}{13}$ ▢

14. Meeta ate $\frac{9}{10}$ of a pizza and Geeta ate $\frac{6}{10}$ of a pizza. Which of the following fractions shows how much more pizza did Meeta eat than Geeta?

(a) $\frac{2}{10}$ ▢ (b) $\frac{3}{10}$ ▢ (c) $\frac{4}{10}$ ▢ (d) $\frac{5}{10}$ ▢

15. What should be placed in the empty space so that the sum of the fractions along each side of the triangle is same?



(a) $\frac{6}{15}$ ▢ (b) $\frac{7}{15}$ ▢

(c) $\frac{8}{15}$ ▢ (d) $\frac{9}{15}$ ▢

QUESTION BAG 2

1. Fill in the blanks.

(a) Fractions with same numerators but different denominators are .... fractions.

(b) In $\frac{8}{9}$, 8 is the .... and 9 is the ....

(c) A .... fraction is always less than 1.

(d) When numerator < denominator, the fraction is called a/an .... fraction.

(e) A/an .... fraction can be converted into a mixed numeral.

(f) One-sixth of 24 candles = ... candles.

(g) $\frac{6}{6}$ is a/an .... fraction.

(h) $\frac{1}{2}$ is a .... fraction.

(i) If numerator and denominator of a fraction are equal, then it is equal to ....

(j) Reena ate 3 toffees out of 5 toffees. The fraction of toffees left is ....

(k) A .... sum can be expressed as a fraction.

2. Write the first five equivalent fractions of

(a) $\frac{1}{6}$ (b) $\frac{4}{5}$ (c) $\frac{5}{7}$

3. Circle the fraction that is not equivalent to the rest.

(a) $\frac{2}{3}, \frac{4}{9}, \frac{10}{15}, \frac{16}{24}$ (b) $\frac{3}{8}, \frac{6}{16}, \frac{12}{32}, \frac{15}{36}$

4. Fill in the missing numerator or denominator in these equivalent fractions.

(a) $\frac{3}{8} = \frac{\square}{56}$ (b) $\frac{6}{23} = \frac{18}{\square}$ (c) $\frac{7}{13} = \frac{\square}{91}$ (d) $\frac{25}{61} = \frac{100}{\square}$

5. Write the missing numbers to make the statement true.

(a) $\frac{3}{4} = \frac{\square}{20} = \frac{21}{\square} = \frac{\square}{32} = \frac{45}{\square}$ (b) $\frac{6}{7} = \frac{\square}{21} = \frac{30}{\square} = \frac{\square}{49} = \frac{24}{\square}$

6. Obtain an equivalent fraction for each of the following by dividing.

(a) $\frac{18}{24} = \square$ (b) $\frac{45}{54} = \square$ (c) $\frac{48}{84} = \square$

7. The total number of students in a Class is 40. Out of these 7 children were absent on a certain day. What fraction of the class was present on that day ?

8. Compare and put the correct symbol >, < or = in the placeholder.

(a) $\frac{1}{5} \bigcirc \frac{1}{2}$ (b) $\frac{3}{5} \bigcirc \frac{3}{7}$ (c) $\frac{1}{15} \bigcirc \frac{1}{12}$

(d) $\frac{9}{13} \bigcirc \frac{9}{10}$ (e) $\frac{8}{15} \bigcirc \frac{7}{15}$ (f) $\frac{2}{5} \bigcirc \frac{3}{5}$

9. Encircle the proper fractions and tick the improper fractions.

$\frac{2}{7}, \frac{3}{2}, \frac{3}{4}, \frac{7}{11}, \frac{8}{7}, \frac{13}{6}, \frac{9}{17}, \frac{11}{25}, \frac{9}{9}$

10. Arrange the following fractions in ascending order.

(a) $\frac{5}{7}, \frac{3}{7}, \frac{1}{7}, \frac{6}{7}$ (b) $\frac{2}{7}, \frac{2}{5}, \frac{2}{8}, \frac{2}{3}$

11. Arrange the following fractions in descending order.

(a) $\frac{7}{13}, \frac{12}{13}, \frac{5}{13}, \frac{9}{13}$ (b) $\frac{7}{14}, \frac{7}{11}, \frac{7}{9}, \frac{7}{16}$

12. Fill in the placeholders.

(a) $\frac{3}{23} + \frac{4}{23} + \frac{6}{23} = \square$ (b) $\frac{7}{19} + \frac{2}{19} + \frac{4}{19} = \square$

(c) $\frac{8}{13} - \frac{3}{13} = \square$ (d) $\frac{9}{17} - \frac{4}{17} = \square$

13. Fill in the placeholders.

(a) $\frac{\square}{7} + \frac{2}{7} = \frac{5}{7}$ (b) $\frac{3}{11} + \frac{\square}{11} = \frac{7}{11}$ (c) $\frac{14}{17} - \frac{\square}{17} = \frac{10}{17}$

(d) $\frac{9}{25} - \frac{\square}{25} = \frac{3}{25}$ (e) $\frac{15}{19} - \frac{\square}{\square} = \frac{11}{19}$ (f) $\frac{4}{13} + \frac{\square}{\square} = \frac{9}{13}$

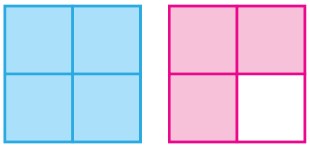
14. Convert the following improper fractions into mixed numerals.

(a) $\frac{7}{3}$ (b) $\frac{54}{7}$ (c) $\frac{99}{8}$ (d) $\frac{163}{11}$

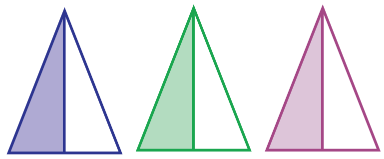
15. Convert the following mixed numerals into improper fractions.

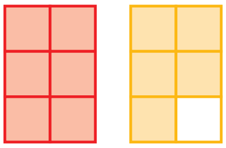
(a) $3\frac{3}{4}$ (b) $9\frac{3}{8}$ (c) $4\frac{5}{12}$ (d) $3\frac{7}{15}$

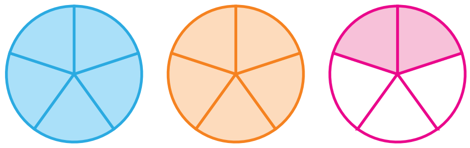
16. Write the improper fraction and mixed numeral represented by the shaded figure.

(a) 

(b) 

(c) 

(d) 

(e) 

17. Put the correct symbol <, > or = in the placeholder.

(a) $8\frac{2}{7} \bigcirc \frac{55}{7}$

(b) $\frac{47}{6} \bigcirc 7\frac{1}{6}$

18. State whether each of the following statements is true or false.

(a) The denominator of a unit fraction is 1. ....

(b) An improper fraction is always greater than 1. ....

(c) $\frac{1}{7}$ and $\frac{1}{8}$ are like fractions. ....

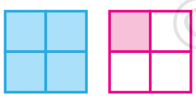
(d) There are 5 halves in $2\frac{1}{2}$. ....

(e) $\frac{1}{6} < \frac{1}{8}$ ....

(f) $\frac{3}{5}$ and $\frac{9}{10}$ are equivalent fractions. ....

(g) $\frac{1}{6}$ is a proper and unit fraction. ....

(h) $\frac{2}{13} + \frac{2}{6} = \frac{2}{19}$. ....

(i)  represents the mixed numeral $2\frac{1}{4}$ . ...

19. Ashu read $\frac{3}{7}$ of his book in the morning and $\frac{2}{7}$ in the evening. What part of the book has he read?

20. Rajeev travelled $\frac{2}{11}$ of his journey on the first day, $\frac{4}{11}$ on the second day and $\frac{3}{11}$ on the third day. What part of the journey did Rajeev cover in the three days?

21. A piece of ribbon was $3\frac{5}{7}$ m long. A piece of length $1\frac{2}{7}$ m was cut from it. What was the length of the remaining ribbon?

10 Decimals
(An Introduction)

Decimal Fractions

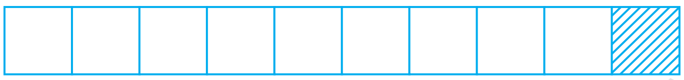
The fractions in which the denominators are 10, 100, 1000, etc. are known as decimal fractions.

For example, $\frac{3}{10}$, $\frac{8}{100}$, $\frac{63}{1000}$, etc. are all decimal fractions.

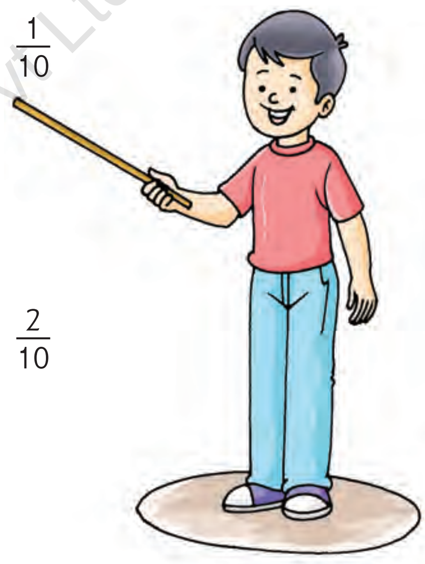
Decimal Fractions with 10 as Denominator (Tenths)

Let us divide a figure into 10 equal parts.

Shade one part.



$\frac{1}{10}$

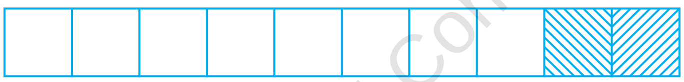


The shaded portion represents one-tenth or $\frac{1}{10}$ of the whole figure.

We denote it by .1 and read it as decimal one or point one.

Again, let us divide a figure into 10 equal parts.

Shade two parts.



$\frac{2}{10}$

The shaded portion represents 2 tenths or $\frac{2}{10}$ of the whole figure.

We denote it by .2 and read it as decimal two or point two.

In general, we have:

Fractional Number	Common Fraction	Decimal Fraction	Read as
1 tenth	$\frac{1}{10}$	.1	decimal one
2 tenths	$\frac{2}{10}$	.2	decimal two
3 tenths	$\frac{3}{10}$	.3	decimal three
4 tenths	$\frac{4}{10}$	.4	decimal four
9 tenths	$\frac{9}{10}$	.9	decimal nine

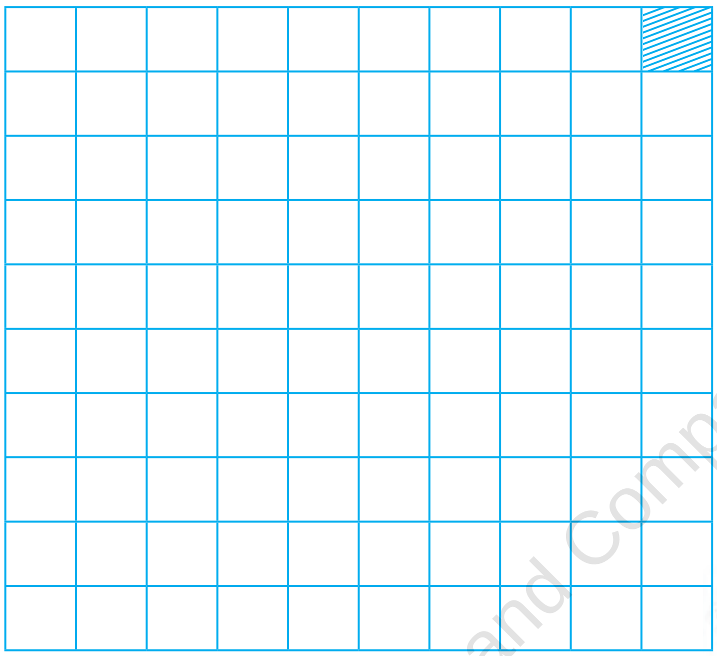
In this way: $\frac{1}{10} = .1$, $\frac{2}{10} = .2$, $\frac{3}{10} = .3$, $\frac{4}{10} = .4$, ..., $\frac{9}{10} = .9$

Note that a decimal fraction with 10 as denominator has one digit after the decimal point. Similarly, a decimal fraction with 100 as denominator has two digits after the decimal point. And, a decimal fraction with 1000 as denominator has three digits after the decimal point and, so on.

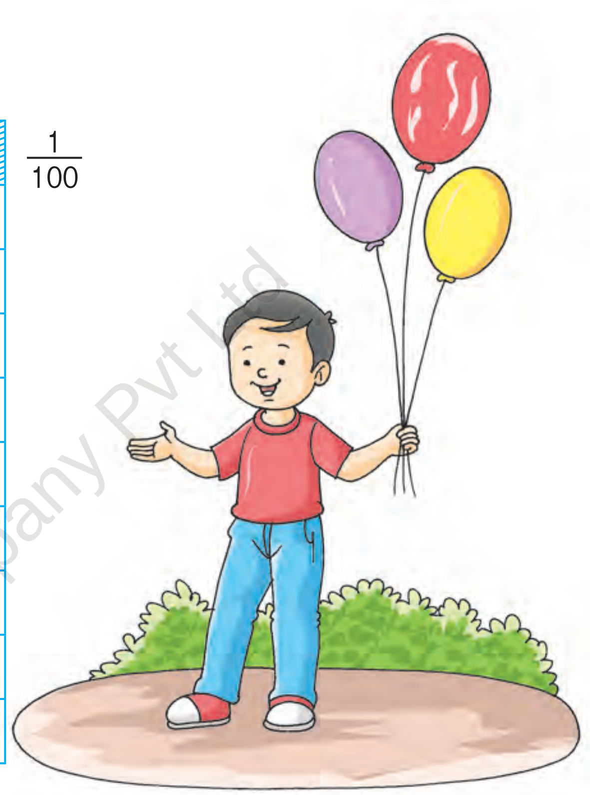
Decimal Fractions with 100 as Denominator (Hundredths)

Let us divide a figure into 100 equal parts.

Shade one part.



$\frac{1}{100}$



Then, the shaded portion represents one hundredths or $\frac{1}{100}$.

We denote it by .01 and read it as decimal zero one.

In general, we have:

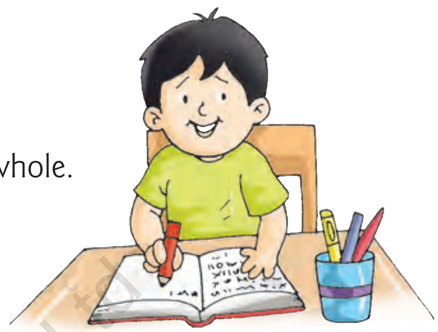
Fractional Number	Common Fraction	Decimal Fraction	Read As
1 hundredth	$\frac{1}{100}$	.01	decimal zero one
2 hundredths	$\frac{2}{100}$	.02	decimal zero two
9 hundredths	$\frac{9}{100}$	.09	decimal zero nine
10 hundredths	$\frac{10}{100}$	.10	decimal one zero
63 hundredths	$\frac{63}{100}$	.63	decimal six three
99 hundredths	$\frac{99}{100}$	.99	decimal nine nine

In this way: $\frac{1}{100} = .01$, $\frac{2}{100} = .02$, $\frac{3}{100} = .03$, ..., $\frac{9}{100} = .09$,

$\frac{10}{100} = .10$, $\frac{11}{100} = .11$, $\frac{12}{100} = .12$, ..., $\frac{99}{100} = .99$.

We remind here that a decimal fraction with 1000 as denominator will have three digits after the decimal point.

Decimal Fractions with 1000 as Denominator (Thousandths)



Suppose a figure is divided into 1000 equal parts and one part is shaded.

Then, the shaded portion represents one thousandth part or $\frac{1}{1000}$ of the whole.

We denote it by .001 and read it as decimal zero zero one.

In general, we have:

Fractional Number	Common Fraction	Decimal Fraction	Read as
1 thousandth	$\frac{1}{1000}$	.001	decimal zero zero one
2 thousandths	$\frac{2}{1000}$	.002	decimal zero zero two
9 thousandths	$\frac{9}{1000}$	.009	decimal zero zero nine
10 thousandths	$\frac{10}{1000}$	.010	decimal zero one zero
14 thousandths	$\frac{14}{1000}$	.014	decimal zero one four
99 thousandths	$\frac{99}{1000}$	.099	decimal zero nine nine
100 thousandths	$\frac{100}{1000}$	.100	decimal one zero zero
623 thousandths	$\frac{623}{1000}$	.623	decimal six two three
999 thousandths	$\frac{999}{1000}$	.999	decimal nine nine nine

In this way, we have $\frac{1}{1000} = .001$, $\frac{2}{1000} = .002$, $\frac{3}{1000} = .003$, ..., $\frac{9}{1000} = .099$,

$$\frac{10}{1000} = .010,\ \frac{11}{1000} = .011,\ \frac{12}{1000} = .012,\ \ldots,\ \frac{99}{1000} = .099$$

$$\frac{100}{1000} = .100,\ \frac{101}{1000} = .101,\ \frac{102}{1000} = .102,\ \ldots,\ \frac{999}{1000} = .999$$

A decimal fraction has two parts — a whole number part and a decimal part.

These parts are separated by a dot (.) called decimal point.

Whole number part is to the left of the decimal point while the decimal part is to its right.

The absence of any of the parts is shown by 0.

Thus, .53 may be written as 0.53.

And, 69 may be written as 69.0.

Also, 23.04 is read as twenty three point zero four.

159.347 is read as one hundred fifty-nine point three four seven.

Decimal Places: In a decimal, the number of digits after the decimal point is known as the number of decimal places.

Thus, 315.94 has two places of decimal.

And, 10.305 has three places of decimal.

Rules for Converting Decimals into Common Fractions

Step 1: Take the given decimal without the decimal point as the numerator.

Step 2: Form a number by annexing as many zeros to the right of 1 as is the number of decimal places in the given decimal.

Take this number as denominator.

For example: $3.7 = \frac{37}{10}$, $2.31 = \frac{231}{100}$, $0.007 = \frac{7}{1000}$, etc.

Decimal Fractions in Place Value Chart

Till now, we have studied the place value chart for numbers, as shown below:

Ten thousands	Thousands	Hundreds	Tens	Ones
10000	1000	100	10	1

According to this chart, we have:

Place value of 7 at ones place = 7 ones = 7.

Place value of 7 at tens place = 7 tens = 70.

Place value of 7 at hundreds place = 7 hundreds = 700.

Place value of 7 at thousands place = 7 thousands = 7000.

Place value of 7 at ten thousands place = 7 ten thousands = 70000.

We know that:

1 thousand = $\frac{1}{10}$ of 1 ten thousand.

1 hundred = $\frac{1}{10}$ of 1 thousand.

1 ten = $\frac{1}{10}$ of 1 hundred.

1 one = $\frac{1}{10}$ of 1 ten.

Thus, in the place value chart, as we shift one place to the right, the value of the digit becomes $\frac{1}{10}$ of its value at the preceding place.

We can now extend the place value chart to tenths, hundredths and thousandths places etc.

These are known as decimal places.

Thus, we have the place value chart as shown below:

Ten thousands	**Thousands**	**Hundreds**	**Tens**	**Ones**	**Decimal Point**	**Tenths**	**Hundredths**	**Thousandths**
10000	1000	100	10	1	.	$\frac{1}{10}$ (0.1)	$\frac{1}{100}$ (0.01)	$\frac{1}{1000}$ (0.001)

Thus, we have:

1 tenth = $\frac{1}{10}$ of 1 one;

1 hundredth = $\frac{1}{10}$ of 1 tenth;

1 thousandth = $\frac{1}{10}$ of 1 hundredth.

In this place value chart, we have:

Place value of 7 at tenth place = $\frac{7}{10}$;

Place value of 7 at hundredths place = $\frac{7}{100}$;

Place value of 7 at thousandths place = $\frac{7}{1000}$.

Decimals in Expanded Form

Consider the decimal number 834.692.

We may arrange it in the place value chart as shown.

Hundreds	Tens	Ones	Decimal Point	Tenths	Hundredths	Thousandths
(100)	(10)	(1)		$\left(\frac{1}{10}\right)$	$\left(\frac{1}{100}\right)$	$\left(\frac{1}{1000}\right)$
8	3	4	.	6	9	2

Clearly, 834.692 = 8 hundreds + 3 tens + 4 ones + 6 tenths + 9 hundredths + 2 thousandths

$$= 800 + 30 + 4 + \frac{6}{10} + \frac{9}{100} + \frac{2}{1000}.$$

This is the expanded form of 834.692, while 834.692 is called the ordinary or short form.

Solved Examples

Example 1: Write each of the following as decimals.

(a) $\frac{7}{10}$ (b) $\frac{8}{100}$ (c) $\frac{37}{100}$

(d) $\frac{5}{1000}$ (e) $\frac{43}{1000}$ (f) $\frac{581}{1000}$

Solution: We have:

(a) $\frac{7}{10} = 0.7$ (b) $\frac{8}{100} = 0.08$ (c) $\frac{37}{100} = 0.37$

(d) $\frac{5}{1000} = 0.005$ (e) $\frac{43}{1000} = 0.043$ (f) $\frac{581}{1000} = 0.581$

Example 2: Write the numeral for each of the following.

(a) 0.5 (b) 0.06 (c) 0.004

(d) 6.25 (e) 2.6 (f) 10.014

Solution: We have:

(a) $0.5 = \frac{5}{10}$ (b) $0.06 = \frac{6}{100}$ (c) $0.004 = \frac{4}{1000}$

(d) $6.25 = \frac{625}{100}$ (e) $2.6 = \frac{26}{10}$ (f) $10.014 = \frac{10014}{1000}$

Example 3: Write the numeral for each of the following.

(a) 0.05 (b) 18.56 (c) 307.092

(d) 0.008 (e) 23.405 (f) 6.7

Solution: We have:

Given Decimal	Number Name
(a) 0.05	decimal zero five
(b) 18.56	eighteen point five six
(c) 307.092	three hundred seven point zero nine two
(d) 0.008	decimal zero zero eight
(e) 23.405	twenty-three point four zero five
(f) 6.7	six point seven

Example 4: Make a place value chart and in this chart show the following decimals.

(a) 236.471 (b) 49.085 (c) 4.07 (d) 0.003

Solution: We may prepare the chart as under:

	Hundreds	Tens	Ones	Decimal Point	Tenths	Hundredths	Thousandths
(a)	2	3	6	.	4	7	1
(b)		4	9	.	0	8	5
(c)			4	.	0	7	
(d)			0	.	0	0	3

Example 5: Write 745.326 in expanded form and hence write down the place value of each of its digits.

Solution: We may place the digits of 745.326 in the place value chart as shown below:

Hundreds	Tens	Ones	Decimal Point	Tenths	Hundredths	Thousandths
7	4	5	.	3	2	6

$\therefore$ 745.326 = 7 hundreds + 4 tens + 5 ones + 3 tenths + 2 hundredths + 6 thousandths

$= 700 + 40 + 5 + \frac{3}{10} + \frac{2}{100} + \frac{6}{1000}$ [expanded form]

$\therefore$ Place value of 7 = 700,

Place value of 4 = 40,

Place value of 5 = 5,

Place value of 3 = $\frac{3}{10}$,

Place value of 2 = $\frac{2}{100}$,

Place value of 6 = $\frac{6}{1000}$.

Example 6: Write the short form of the following decimal.

$$200 + 80 + 9 + \frac{3}{10} + \frac{5}{100} + \frac{4}{1000}$$

Solution: We have:

$$200 + 80 + 9 + \frac{3}{10} + \frac{5}{100} + \frac{4}{1000}$$

= 2 hundreds + 8 tens + 9 ones + 3 tenths + 5 hundredths + 4 thousandths.

Putting the above number in the place value chart, we have:

Hundreds	Tens	Ones	Decimal Point	Tenths	Hundredths	Thousandths
2	8	9	.	3	5	4

$$\therefore\ 200 + 80 + 9 + \frac{3}{10} + \frac{5}{100} + \frac{4}{1000} = 289.354.$$

Exercise 39

1. Write each of the following as a decimal.

(a) $\frac{5}{10}$ (b) $\frac{4}{100}$ (c) $\frac{29}{100}$ (d) $\frac{60}{100}$

(e) $\frac{743}{1000}$ (f) $\frac{800}{1000}$ (g) $\frac{17}{1000}$ (h) $\frac{3}{1000}$

2. Write each of the following as a fraction.

(a) 0.6 (b) 0.02 (c) 0.16 (d) 0.009

(e) 0.053 (f) 0.108 (g) 0.754 (h) 0.910

3. Write the number name of each of the following.

(a) 0.1 (b) 0.01 (c) 1.013 (d) 12.608

(e) 106.36 (f) 13.97 (g) 613.8 (h) 217.503

4. Write the following in figures.

(a) decimal two nine (b) decimal three zero seven

(c) thirteen point eight (d) ninety-three point one four seven

(e) one hundred eighteen point seven zero three
(f) seven hundred point seven three eight
(g) seventy point zero four three
(h) nine hundred nine point zero nine one
(i) eighty-one point one

5. Match the following.

Five thousandths	0.50
Five and five tenths	0.55
Fifty-five hundredths	5.5
Five hundredths	0.005
Fifty hundredths	0.05

6. Write each of the following decimals in the place value chart and write down the place value of each of its digits.

(a) 0.67 (b) 5.18 (c) 60.43 (d) 29.354
(e) 103.24 (f) 14.506 (g) 0.695 (h) 536.008

7. Write each of the following decimals in an expanded form.

(a) 83.74 (b) 25.06 (c) 13.245 (d) 73.009
(e) 49.068 (f) 501.04 (g) 158.091 (h) 765.149

8. Write the place value of 6 in each of the following.

(a) 48.65 (b) 71.456 (c) 100.063 (d) 5.654
(e) 317.006 (f) 64.07

9. Complete each of the following statements.

(a) $0.538 = \frac{5}{10} + \frac{3}{100} + \frac{8}{\square}$

(b) $9.204 = 9 + \frac{2}{10} + \frac{4}{\square}$

(c) $6.07 = 6 + \frac{7}{\square}$

(d) $10.083 = 10 + \frac{8}{\square} + \frac{3}{\square}$

(e) $16.745 = 10 + \square + \frac{7}{\square} + \frac{4}{\square} + \frac{5}{\square}$

(f) $130.067 = 100 + 30 + \frac{6}{\square} + \frac{7}{\square}$

10. Write each of the following in short form.

(a) $8 + \frac{2}{10} + \frac{7}{100} + \frac{3}{1000}$

(b) $70 + 6 + \frac{3}{10} + \frac{2}{100} + \frac{5}{1000}$

(c) $600 + 30 + 5 + \frac{7}{10} + \frac{4}{1000}$

(d) $10 + 6 + \frac{2}{1000}$

(e) $9 + \frac{1}{100}$

(f) $200 + 6 + \frac{5}{100} + \frac{9}{1000}$

(g) $70 + 1 + \frac{8}{1000}$

(h) $40 + \frac{2}{10} + \frac{3}{1000}$

Things to Remember

1. The fractions in which the denominators are 10, 100, 1000 etc. are known as decimal fractions.

2. $\frac{1}{10} = .1, \frac{2}{10} = .2, \frac{3}{10} = .3, \ldots, \frac{9}{10} = .9.$

3. $\frac{1}{100} = .01, \frac{2}{100} = .02, \frac{3}{100} = .03, \ldots, \frac{9}{100} = .09.$

   $\frac{10}{100} = .10, \frac{11}{100} = .11, \frac{12}{100} = .12, \ldots, \frac{99}{100} = .99.$

4. $\frac{1}{1000} = .001, \frac{2}{1000} = .002, \frac{3}{1000} = .003, \ldots, \frac{9}{1000} = .009.$

   $\frac{10}{1000} = .010, \frac{11}{1000} = .011, \frac{12}{1000} = .012, \ldots, \frac{99}{1000} = .099.$

   $\frac{100}{1000} = .100, \frac{101}{1000} = .101, \frac{102}{1000} = .102, \ldots, \frac{999}{1000} = .999.$

5. To find the place value of different digits in decimal numbers, we have the place value chart as shown below:

Ten thousands	Thousands	Hundreds	Tens	Ones	Decimal Points	Tenths	Hundredths	Thousandths
10000	1000	100	10	1	.	$\frac{1}{10}$ (0.1)	$\frac{1}{100}$ (0.01)	$\frac{1}{1000}$ (0.001)

6. The expanded form of 256.137 is:

   $200 + 50 + 6 + \frac{1}{10} + \frac{3}{100} + \frac{7}{1000}.$

7. To Convert Decimal Numbers into Common Fractions:

   Step 1: Take the given decimal without the decimal point as the numerator.

   Step 2: Form a number by annexing as many zeros to the right of 1 as is the number of decimal places in the given decimal.

   Take this as the denominator.

   Thus $2.3 = \frac{23}{10}, 4.71 = \frac{471}{100}.$

C.C.E. Drill 8

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. $\frac{3}{10}$ is read as

(a) three tens (b) three tenths

(c) three sevenths (d) three hundredths

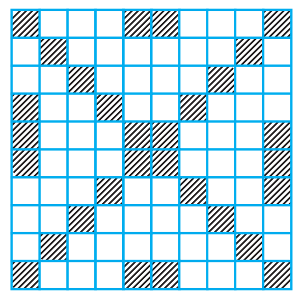
2. Seventy hundredths is written as

(a) 0.07 (b) 0.70 (c) 0.070 (d) 0.77

3. The decimal form of the fraction $\frac{9}{100}$ is

(a) 0.9 (b) 9 (c) 0.09 (d) 1.09

4. In the adjoining figure, the shaded part represents



(a) 0.30 (b) 0.03

(c) 0.003 (d) 3

5. 46.3 = ...

(a) $\frac{46}{10}$ (b) $\frac{460}{10}$ (c) $46\frac{3}{10}$ (d) $\frac{463}{100}$

6. $\frac{93671}{1000}$ = ...

(a) 9.3671 (b) 93.671 (c) 9367.1 (d) 936.71

7. 12.5 = ...

(a) $12\frac{5}{10}$ (b) $\frac{125}{10}$ (c) $12\frac{1}{2}$ (d) All of these

8. The decimal number for $\frac{9}{10} + \frac{3}{1000}$ is

(a) 0.093 (b) 0.903 (c) 0.930 (d) 9.03

9. $900 + 90 + \frac{9}{10} + \frac{9}{100}$ = ...

(a) 990.99 (b) 99.99 (c) 909.09 (d) 990.09

10. The expanded form of 87.5 is

(a) $80 + 7 + \frac{5}{10}$ ☐ (b) $870 + \frac{5}{10}$ ☐ (c) $8 + 70 + \frac{5}{100}$ ☐ (d) $80 + 7 + \frac{5}{100}$ ☐

11. The place value of 8 in 93.287 is

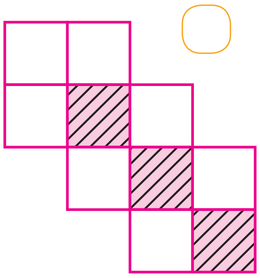
(a) $\frac{8}{10}$ ☐ (b) $\frac{8}{100}$ ☐ (c) 80 ☐ (d) 800 ☐

12. The place value of 7 in 87.3 is

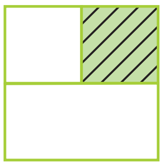
(a) 7 ☐ (b) 70 ☐ (c) $\frac{7}{10}$ ☐ (d) 800 ☐

13. In which figure does the shaded part represent 0.3?

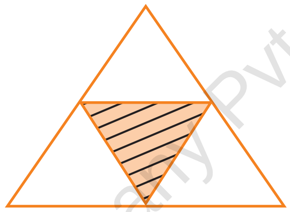
(a) ☐



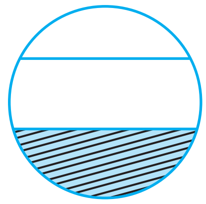
(b) ☐



(c) ☐



(d) ☐



QUESTION BAG 2

1. Write as decimals.

(a) $83\frac{7}{10}$ (b) $65\frac{23}{100}$ (c) $71\frac{9}{100}$ (d) $29\frac{11}{1000}$

(e) $75\frac{3}{1000}$ (f) $138\frac{213}{1000}$ (g) $\frac{97}{1000}$ (h) $\frac{6037}{1000}$

2. Write each of the following in decimal form.

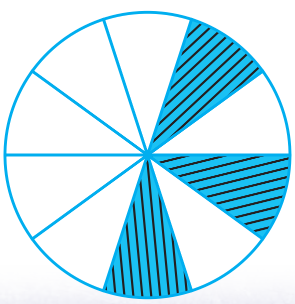
(a) 7 tenths 2 hundredths 5 thousandths

(b) 8 tenths 3 thousandths

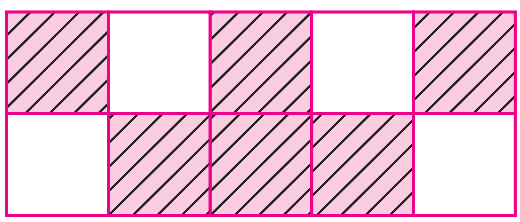
(c) 4 hundredths 9 thousandths

3. Write the fractions and decimal fractions represented by the shaded part in each of the following figures.

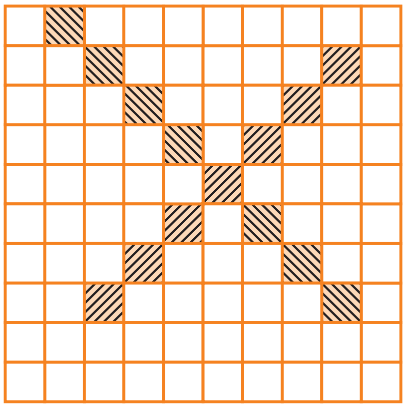
(a)



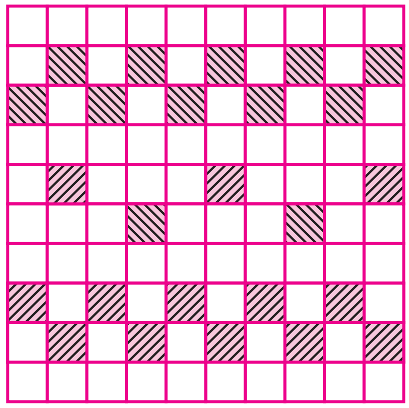
(b)



(c)



(d)



4. Fill in the blanks.

(a) 8 and 5 hundredths is written as ....

(b) Forty-five thousandths is written as ....

(c) $0.085 = \dfrac{\boxed{}}{1000}$

(d) $84.545 = 80 + \boxed{} + \dfrac{5}{10} + \dfrac{\boxed{}}{100} + \dfrac{5}{\boxed{}}$

(e) In 620.84, we have 2 at .... place while in 680.24, we have 2 at .... place.

5. Write the place value of the underlined digit in each of the following.

(a) 67.0$\underline{5}$2 (b) 8$\underline{1}$.94 (c) 67.$\underline{6}$76

(d) $\underline{8}$04.408 (e) 967.87$\underline{9}$ (f) 5.$\underline{0}$74

11 Money

We buy things by giving money.

Currency

The money used in a particular country is called its currency.

Indian currency is 'Rupees and Paise'.

In short, we write Rupees as ₹ and Paise as p.

The singular form of Rupees is Rupee

The singular form of Paise is Paisa.

We know that:

100 paise = ₹ 1

$\therefore$ 1 paisa = ₹ $\frac{1}{100}$ = ₹ 0.01

We write:

1 p = ₹ 0.01; 2 p = ₹ 0.02; 3 p = ₹ 0.03; ...; 9 p = ₹ 0.09;

10 p = ₹ 0.10; 11 p = ₹ 0.11; 12 p = ₹ 0.12; ...; 99 p = ₹ 0.99.

Expressing Money in Words and Figures

We know from our previous Class how to express money in words and figures. However, the following examples will make things more clear.

	Money in Words	Money in Figures	
		Long Form	Short Form
(a)	Rupees thirty-eight and paise fifty	38 rupees 50 paise	₹ 38.50
(b)	Rupees seventy two and paise twenty	72 rupees 20 paise	₹ 72.20
(c)	Rupees twelve and paise seventy-five	12 rupees 75 paise	₹12.75
(d)	Rupees forty and paise eighteen	40 rupees 18 paise	₹ 40.18
(e)	Rupees eight and paise five	8 rupees 05 paise	₹ 8.05
(f)	Rupees ten	10 rupees	₹ 10.00
(g)	Paise sixty	60 paise	₹ 0.60
(h)	Rupee one	1 rupee	₹ 1.00

To Convert Rupees into Paise

Rule: For converting rupees into paise, we multiply the amount in rupees by 100.

Examples: 8 rupees = (8×100) paise = 800 paise.

11 rupees = (11×100) paise = 1100 paise.

To Convert Rupees and Paise into Paise

Rule: In order to convert rupees and paise into paise, we multiply the amount in rupees by 100 and add to it the number of paise.

Example: **Convert 26 rupees 85 paise into paise.**

Solution: 26 rupees 85 paise = (26×100) paise + 85 paise

= 2600 paise + 85 paise

= 2685 paise.

To Convert an Amount Expressed in Figures into Paise

Rule: In order to convert an amount given in figures into paise, we remove the symbol '₹' and the dot.

Example: **Convert the following amounts into paise.**

(a) ₹ 31.25 (b) ₹ 18.06 (c) ₹ 0.83

Solution: We have:

(a) ₹ 31.25 = 3125 paise.

(b) ₹ 18.06 = 1806 paise.

(c) ₹ 0.83 = 83 paise.

To Convert an Amount Given in Paise into Rupees and Paise

Rule: To convert paise into rupees, we put a dot after two digits from the right of the given number showing paise. The numeral on the left of the dot gives the number of rupees and that on the right gives paise.

Example: **Express each of the following amounts in rupees.**

(a) 2634 p (b) 605 p (c) 87 p (d) 9 p

Solution: We have:

(a) 2634 p = ₹ 26.34 (b) 605 p = ₹ 6.05

(c) 87 p = ₹ 0.87 (d) 9 p = ₹ 0.09

Exercise 40

1. **Express each of the following amounts in figures.**

   (In long form and short form)

   (a) Rupees eighty-three and paise forty-five
   (b) Rupees seventeen and paise ninety
   (c) Rupees one hundred six and paise fifteen
   (d) Rupees two hundred and paise eight
   (e) Rupee one and paise sixty-four
   (f) Rupees eleven and paise five
   (g) Rupees four and paise four
   (h) Sixty-five paise
   (i) Six paise

2. **Express each of the following amounts in words.**

   (a) ₹ 76.50 ....
   (b) ₹ 90.05 ....
   (c) ₹ 165.25 ....
   (d) ₹ 84.00 ....
   (e) ₹ 1008.85 ....
   (f) ₹ 0.94 ....
   (g) ₹ 1.08 ....
   (h) ₹ 0.06 ....

3. **Convert each of the following amounts into paise**.

   (a) 34 rupees 65 paise
   (b) 102 rupees 40 paise
   (c) 200 rupees 05 paise
   (d) 1325 rupees 20 paise
   (e) 9 rupees 09 paise
   (f) 718 rupees 56 paise
   (g) 501 rupees 01 paisa
   (h) 1 rupee 15 paise

4. **Convert each of the following amounts into paise.**

   (a) ₹ 16.50
   (b) ₹ 23.05
   (c) ₹ 237.18
   (d) ₹ 8.09
   (e) ₹ 331.42
   (f) ₹ 1035.23
   (g) ₹ 606.14
   (h) ₹ 500.80
   (i) ₹ 1.01

5. **Convert each of the following amounts into rupees.**

   (a) 3156 p
   (b) 10437 p
   (c) 8540 p
   (d) 481 p
   (e) 1005 p
   (f) 303 p
   (g) 95 p
   (h) 6 p
   (i) 14 p
   (j) 16145 p
   (k) 5000 p
   (l) 1208 p

Addition and Subtraction of Money

Rule: To add or subtract given amounts of money, we follow the following steps:

Step 1: Express the given amounts in figures, using decimal notation.

Step 2: Arrange the given amounts in a columns in such a way that all the decimal points fall in one column.

Step 3: Add or subtract the amounts as ordinary numbers.

Step 4: In the sum or difference so obtained, put the decimal point in the decimal point's column.

Solved Examples

Example 1: Add ₹ 637.65, ₹ 94 and ₹ 0.85.

Solution: Arranging the given amounts in columns and then adding columnwise, we get:

		1	1	1	.	1	
	₹	6	3	7	.	6	5
	₹		9	4	.	0	0
+	₹			0	.	8	5
	₹	7	3	2	.	5	0

∴ Required sum = ₹ 732.50.

Example 2: A man purchased vegetables worth of ₹ 168.75; fruits worth of ₹ 206.40, pulses worth of ₹ 319.50 and dry fruits worth of ₹ 453.85. How much money did he spend in all?

Solution: We have:

				1	2	2	.	1	
Money spent on vegetables	=	₹		1	6	8	.	7	5
Money spent on fruits	=	₹		2	0	6	.	4	0
Money spent on pulses	=	₹		3	1	9	.	5	0
Money spent on dry fruits	= +	₹		4	5	3	.	8	5
Total money spent	=	₹	1	1	4	8	.	5	0

Hence, the man spent ₹ 1148.50 in all.

Example 3: Subtract ₹ 87.65 from ₹ 203.

Solution: Arranging the given amounts in columns and subtracting columnwise, we get:

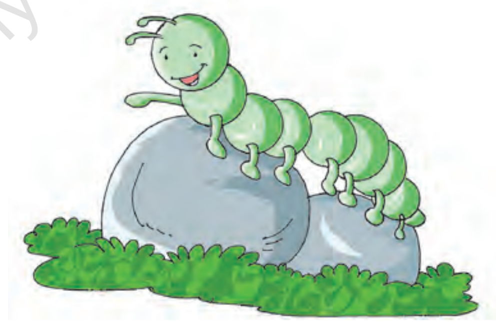
$$\begin{array}{cccccccc} & & & & 9 & 12 & & \\ & & & 1 & \cancel{10} & \cancel{2} & 10 & 0 \\ & ₹ & \cancel{2} & \cancel{0} & \cancel{3} & . & \cancel{0} & \cancel{0} \\ - & ₹ & & 8 & 7 & . & 6 & 5 \\ \hline & ₹ & 1 & 1 & 5 & . & 3 & 5 \\ \hline \end{array}$$

∴ Required difference = ₹ 115.35.

Example 4: Subtract ₹ 135.45 from ₹ 400.20.

Solution: Arranging the given amounts in columns and subtracting columnwise, we get:

$$\begin{array}{ccccccc} & & 3 & 9 & 9 & 12 & 0 \\ & ₹ & \cancel{4} & \cancel{0} & \cancel{0} \,. & \cancel{2} & \cancel{0} \\ - & ₹ & 1 & 3 & 5\,. & 4 & 5 \\ \hline & ₹ & 2 & 6 & 4\,. & 7 & 5 \\ \hline \end{array}$$



∴ Required difference = ₹ 264.75

Example 5: Kunal had ₹ 5000 with him. He spent ₹ 3085.75 in buying a table and a chair. How much money is left with him?

$$\begin{array}{llcccccccc} & & & 4 & 9 & 9 & 9 & & 10 & 0 \\ \textbf{Solution:}\ \text{Total money with Kunal} & = & ₹ & \cancel{5} & \cancel{0} & \cancel{0} & \cancel{0} & . & \cancel{0} & \cancel{0} \\ \text{Money spent by him} & = - & ₹ & 3 & 0 & 8 & 5 & . & 7 & 5 \\ \hline \text{Money left with him} & = & ₹ & 1 & 9 & 1 & 4 & . & 2 & 5 \\ \hline \end{array}$$

Hence, an amount of ₹ 1914.25 is left with Kunal.

Example 6: Meena bought the following items from a book store:

Books worth ₹ 465.80; Exercise books worth ₹ 326.40; Stationery goods worth ₹ 243.50 and Colours worth ₹ 56.75. She paid ₹ 1500.00 to the bookseller. How much money did she get back?

Solution: Writing the costs of different items columnwise and adding, we get:

			1 2 2
Cost of books	=		₹ 465.80
Cost of exercise books	=		₹ 326.40
Cost of stationery	=		₹ 243.50
Cost of colours	=	+	₹ 56.75
Total cost of all the items	=		₹ 1092.45

			1 4 9 9 10 0
Now, Total money paid	=		₹ ~~1500~~ . ~~00~~
Total cost of all the items	=	–	₹ 1092.45
Money received back by Meena	=		₹ 407.55

Hence, Meena received back ₹ 407.55.

Exercise 41

Add the following amounts.

1.

	₹ 647.50
	₹ 108.25
+	₹ 36.85

2.

	₹ 268.45
	₹ 376.38
+	₹ 139.62

3.

	₹ 1035.60
	₹ 678.45
+	₹ 9.68

4.

	₹ 1654.09
	₹ 860.56
+	₹ 78.33

5.

	₹ 3568.42
	₹ 2457.58
+	₹ 0.95

6.

	₹ 4509.34
	₹ 10753.65
+	₹ 3241.56

7. Add: ₹ 1546.35; ₹ 167.85; ₹ 6.54 and ₹ 0.56.

8. Add: ₹ 3541.90; ₹ 2053.08; ₹ 162.06 and ₹ 0.01.

9. Meera buys a pencil for ₹ 6.40; an eraser for ₹ 8.65 and an ink pen for ₹ 57.75. What is the total amount she has to pay to the shopkeeper?

10. Nitin bought some gifts worth of ₹ 856.65; confectionery goods worth of ₹ 268.85 and some decoration pieces worth of ₹ 93.05 on the occasion of his son's birthday. How much money did he spend in all?

Find the difference.

11.
```
  ₹ 705.30
– ₹  78.56
__________
```

12.
```
  ₹ 356.50
– ₹ 198.75
__________
```

13.
```
  ₹ 500.00
– ₹ 263.75
__________
```

14.
```
  ₹ 1000.00
– ₹  625.48
___________
```

15.
```
  ₹ 2016.34
– ₹  586.68
___________
```

16.
```
  ₹ 3510.20
– ₹ 1728.65
___________
```

17. A pencil costs ₹ 8.30 and an eraser costs ₹ 3.75. Which costs more and by how much?

18. Mona received ₹ 1305.00 from her mother. Her brother Amit received ₹ 908.75 from his father. Who received more and by how much?

19. Tanvy bought biscuits for ₹ 106.65; bread for ₹ 27.45 and toffees for ₹ 8.95 from a confectionery shop. She gave a 500-rupee note to the shopkeeper. What amount does she get back?

20. Teena bought a shirt for ₹ 1265.85; trousers for ₹ 896.45 and an underwear for ₹ 78.05. She gave ₹ 2500.00 to the shopkeeper. How much money did she get back?

Multiplication of Money by a Whole Number

Step 1: Write the given amount of money in figures without decimal point.

Step 2: Multiply the amount by the given whole number as we multiply numbers.

Step 3: In the product, put the decimal point after the second digit from the right.

Solved Examples

Example 1: Multiply ₹165.34 by 8.

Solution: We have:

$16534 \times 8 = 132272$

$\therefore$ ₹ $165.34 \times 8 =$ ₹ 1322.72

```
   16534
  ×    8
  ______
  132272
```

Example 2: If each pen costs ₹ 56.35, find the cost of 29 such pens.

Solution. Cost of 1 pen = ₹ 56.35

Cost of 29 pens = ₹ 56.35 × 29

= ₹ 1634.15

Hence, the cost of 29 pens is ₹ 1634.15.

$$\begin{array}{r} 5\,6\,3\,5 \\ \times\ 2\,9 \\ \hline 5\,0\,7\,1\,5 \\ +\,1\,1\,2\,7\,0\,0 \\ \hline 1\,6\,3\,4\,1\,5 \\ \hline \end{array}$$

Example 3: If the cost of one chair is ₹ 756.85, find the cost of 23 such chairs.

Solution: Cost of 1 chair = ₹ 756.85

Cost of 23 chairs = ₹ 756.85 × 23

= ₹ 17407.55

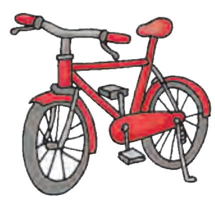
Hence, the cost of 23 chairs is ₹ 17407.55.

$$\begin{array}{r} 7\,5\,6\,8\,5 \\ \times\ 2\,3 \\ \hline 2\,2\,7\,0\,5\,5 \\ +\,1\,5\,1\,3\,7\,0\,0 \\ \hline 1\,7\,4\,0\,7\,5\,5 \\ \hline \end{array}$$

Exercise 42

Find each of the following products.

1. ₹ 15.85 × 8
2. ₹ 90.76 × 15
3. ₹ 114.65 × 16
4. ₹ 216.06 × 20
5. ₹ 263.58 × 32
6. ₹ 1540.65 × 43
7. If the cost of 1 kg rice is ₹ 63.50, find the cost of 15 kg of rice.
8. A tennis racket costs ₹ 532.68. Find the cost of 8 such rackets.
9. A calculator costs ₹ 928.45. Find the cost of 16 such calculators.
10. A ceiling fan costs ₹ 1283.75. Find the cost of 14 such fans.
11. A bicycle costs ₹ 2795.80. Find the cost of 25 such bicycles.
12. Punam's monthly salary is ₹ 16825.50. What is her annual income?



Division of Money by a Whole Number

Step 1: Write the given amount of money in figures without decimal point.

Step 2: Divide the amount by the given whole number taking the amount as an ordinary number.

Step 3: In the quotient, put a decimal point after 2 digits from the right.

Solved Examples

Example 1: Divide ₹ 115.15 by 7.

Solution: We first divide 11515 by 7 as shown here.

```
      1 6 4 5
  7 ) 1 1 5 1 5
    - 7
      4 5
    - 4 2
        3 1
      - 2 8
          3 5
        - 3 5
            0
```

∴ 11515 ÷ 7 = 1645.

Hence, ₹ 115.15 ÷ 7 = ₹ 16.45.

Example 2: If 8 cups cost ₹ 134.00, find the cost of each cup.

Solution: Cost of 8 cups = ₹ 134.00

Cost of 1 cup = ₹ 134.00 ÷ 8

= ₹ 16.75 [∵ 13400 ÷ 8 = 1675]

```
      1 6 7 5
  8 ) 1 3 4 0 0
    - 8
      5 4
    - 4 8
        6 0
      - 5 6
          4 0
        - 4 0
            0
```

Hence, the cost of each cup is ₹ 16.75.

Example 3: The cost of 24 bags of rice is ₹ 6500.40. Find the cost of each bag.

Solution. Cost of 24 bags of rice = ₹ 6500.40

∴ Cost of each bag = ₹ 6500.40 ÷ 24

= ₹ 270.85

```
         2 7 0 8 5
  24 ) 6 5 0 0 4 0
     - 4 8
       1 7 0
     - 1 6 8
           2 0 4
         - 1 9 2
             1 2 0
           - 1 2 0
                 0
```

Hence, the cost of each bag of rice is ₹ 270.85.

Exercise 43

1. **Divide:**

   (a) ₹ 52.50 by 6 (b) ₹ 299.04 by 8

   (c) ₹ 490.80 by 12 (d) ₹ 1056.60 by 10

2. If 8 ball pens cost ₹ 68.80, find the cost of one ball pen.
3. If 12 erasers cost ₹ 10.20, find the cost of one eraser.
4. If the cost of 10 kg of potatoes is ₹ 103.50, find the cost of 1 kg of potatoes.

5. Five children went to a picnic. The total expenditure incurred was ₹ 614.00. How much is the share of each?
6. If Mona gets ₹ 320.25 as pocket money each week, how much money does she get daily?
7. Lal Chand earns ₹ 2279.20 per week. How much does he earn each day?

Things to Remember

1. 100 paise = ₹ 1

   1 paisa = ₹ $\frac{1}{100}$ = ₹ 0.01

2. **Addition and Subtraction of Money**

   Step 1: Express the given amounts in figures.

   Step 2: Arrange the amounts in columns such that the decimal points remain in one column.

   Step 3: Add or subtract the amounts as ordinary numbers.

   Step 4: Put the decimal point in the decimal's column.

3. **Multiplication of Money by a Whole Number**

   Step 1: Write the given amount in figures.

   Step 2: Multiply the amount by the given whole number as we multiply numbers.

   Step 3: In the product, put a decimal point after the second digit from the right.

4. **Division of Money by a Whole Number**

   Step 1: Write the given amount in figures.

   Step 2: Divide the amount by the given whole number taking the amount as an ordinary number.

   Step 3: In the quotient, put a decimal point after 2 digits from the right.

Activity Time

In order to make up our daily needs, we purchase things from the market.

We buy provisions, fruits, vegetables, clothes, medicines, jewellery, books, stationery items and other articles from various shops.

When we buy some articles from a shop, the shopkeeper hands over the articles to us and we pay him the total cost of these articles.

He makes a record of, the articles we buy, the rate of each article, the cost of each article and the total price etc. on a slip of paper, called the Sales Slip or Bill or Cash Memo.

Blank bills in printed form are available with the shopkeeper.

A printed bill has:

(i) The name, address and phone number of the shop;

(ii) Bill number;

(iii) Space to write the date of purchase;

(iv) Space to write the name and address of the buyer;

(v) Five columns, one each for serial number, the name of the item, quantity, rate and the amount;

(vi) Space to write the total price;

(vii) Space for signature of the seller.

Form of a Blank Bill

One specimen of a blank bill is given below:

LAXMI PROVISION STORE Karol Bagh, New Delhi			Phone: 26893152 Bill No.	
Name & Address:			Date	
S. No.	**Name of the item**	**Quantity**	**Rate**	**Amount**
			Total	
				For Laxmi Provision Store

Preparing a Bill

Suppose Mr A.K. Jain of G-60, Janak Puri, New Delhi purchased the following articles from Laxmi Provision Store:

Rice 6 kg at ₹ 35 per kg; Ghee 2 kg at ₹ 57 per kg; Sugar 3 kg at ₹ 25.60 per kg;
Dal 4 kg at ₹ 22.50 per kg; Tea 2 kg at ₹ 105.75 per kg and 3 soap cakes at ₹ 8 per cake.

The bill for the above purchases may be prepared as under:

LAXMI PROVISION STORE
Karol Bagh, New Delhi

Phone: 26893152
Bill No. ....

Name & Address: A.K. Jain
G-60, Janak Puri, New Delhi

Date 29-04-2016

S. No.	Name of the item	Quantity	Rate	Amount
1.	Rice	6 kg	₹ 35/kg	210.00
2.	Ghee	2 kg	₹ 57/kg	114.00
3.	Sugar	3 kg	₹ 25.60/kg	76.80
4.	Dal	4 kg	₹ 22.50/kg	90.00
5.	Tea	2 kg	₹ 105.75/kg	211.50
6.	Soap Cake	3	₹ 8 each	24.00
			Total	726.30

For Laxmi Provision Store

Now attempt the following:

1. Mr R.K. Gupta purchased the following items from Hema Provision Store, Preet Vihar, New Delhi:

   Sugar – 6 kg at ₹ 26.50 per kg; Rice – 5 kg at ₹ 36.40 per kg; Rajma – 4 kg at ₹ 18.75 per kg; Dal – 2 kg at ₹ 23.60 per kg; Coffee powder – 2 tins at ₹ 47 per tin; Chillies – 2 kg at ₹ 56.80 per kg; Refined oil – 4 kg at ₹ 56 per kg.

   Prepare a bill for the above purchases.

2. Mr Shyam Lal Gupta purchased the following items from Geeta General Store, Gurgaon:

   Bath tub – 2 at ₹ 265 each; Mug – 4 at ₹ 14.50 each; Duster – 5 at ₹ 8.40 each; Basket – 3 at ₹ 17.60 each; Table cover – 2 at ₹ 105.75 each; Gum bottle – 1 at ₹ 15.20 each; Surf – 2 packets at ₹ 36.65 each and Washing soap – 6 bars at ₹ 8.35 per bar.

   Prepare a bill for the purchases made by Mr Shyam Lal Gupta.

3. Sneh purchased the following items from M/s. Delhi Stationers, Karol Bagh:

   Pens – 3 at ₹ 12.80 each; Pencils – 5 at ₹ 2.60 each; Ink bottle – 2 at ₹ 23.50 each; Notebooks – 18 at ₹ 14.50 each; Erasers – 4 at ₹ 2.50 each; Colour box – 1 at ₹ 21.50 each and Drawing sheets – 6 at ₹ 1.50 each.

   Prepare a bill for the above purchase made by Sneh.

C.C.E. Drill 9

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. The number of 25 paise coins in ₹ 100 is

(a) 4 (b) 40 (c) 100 (d) 400

2. The number of 50 rupee notes in ₹ 1000 is

(a) 10 (b) 20 (c) 100 (d) 200

3. How many 100 rupee notes make a sum of ₹ 1 lakh?

(a) 10 (b) 100 (c) 500 (d) 1000

4. Sonia bought 4 pencils at ₹ 3.30 each and 2 erasers at ₹ 1.85 each. What is the total amount she has to pay for all the items?

(a) ₹ 14.75 (b) ₹ 15.85 (c) ₹ 16.40 (d) ₹ 16.90

5. If the cost of 6 litres of petrol is ₹ 388.00, what is the cost of 1 litre of petrol?

(a) ₹ 46.50 (b) ₹ 47.50 (c) ₹ 64.70 (d) ₹ 49.40

6. What is the cost of 45 kg of wheat, if the cost of 1 kg of wheat is ₹ 18.65?

(a) ₹ 821.25 (b) ₹ 832.50 (c) ₹ 834.75 (d) ₹ 839.25

7. Gaurav sold 18 biscuit packets for ₹ 22.50. The cost of each packet is

(a) ₹ 1.15 (b) ₹ 1.25 (c) ₹ 1.45 (d) ₹ 1.65

8. The annual salary of Mr Gupta is ₹ 148176.00. What is his monthly salary?

(a) ₹ 12635.00 (b) ₹ 12365.50 (c) ₹ 12348.00 (d) ₹ 12384.00

QUESTION BAG 2

1. Compare and put the correct symbol >, < or = in the placeholder.

(a) ₹ 34.85 ☐ 3845 p (b) ₹ 63.36 ☐ 6363 p

(c) ₹ 70.7 ☐ 7007 p (d) ₹ 87.54 ☐ 8745 p

(e) ₹ 9.09 ☐ 909 p

2. **Tick (✓) the correct statements and correct the wrong ones.**

(a) ₹ 47.65 = 4765 p

(b) 92580 P = ₹ 92.58

(c) 1015 P = ₹ 101.50

(d) ₹ 108.90 = 10890 p

3. Naman buys a medium pizza for ₹ 189.75 and Dishant buys a large pizza for ₹ 210. How much more does Dishant spend?

4. Mr Shroff bought the following articles.

Item	Quantity	Rate per piece
Ice cream	2	₹ 13.85
Hat	1	₹ 65.40
Burger	3	₹ 22.25

Find the total amount spent by Mr Shroff.

5. If 9 ball pens cost ₹ 40.50, how much does each pen cost?

6. Radhika bought 3 chocolates each costing ₹ 17.50. How much change did she get back from a ₹ 100 note?

7. Varun bought 8 notebooks each costing ₹ 15.70. If he had ₹ 300 with him, how much money is left with him?

8. Nisha wants to buy a towel costing ₹ 216.25. She has ₹ 179.50 with her. How much more does she need?

9. If 1 banana costs ₹ 2.35, find the cost of one dozen bananas.

10. A torch costs ₹ 65.80. A set of batteries costs ₹ 16.50. How much does it cost to buy 2 of each?

11. Eight friends of Tarun contributed equally to buy a gift for his birthday. If the gift costs ₹ 586.00, how much did each friend contribute?

12 Measures of Length, Mass and Capacity

In Class 3, we have learnt about the standard units for measuring length, mass and capacity. There are some other units also for measuring these quantities.

In this chapter, we shall introduce these new units and study the method of converting one unit into another.

We shall be using some common words for defining these units.

These words along with their meanings are given below.

Words	kilo	hecto	deca	deci	centi	milli
Meanings	1000	100	10	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$

The above system of measurement came to be known as the metric system of measurement. Let us discuss it in detail.

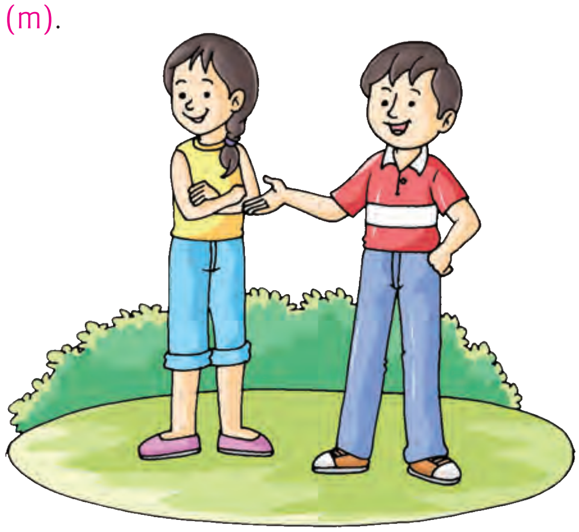
Measures of Length

We know that the standard unit for measuring length is metre (m).

The units of length higher than metre are:

kilometre (km), hectometre (hm) and decametre (dam)

We have:



1 kilometre (km)	=	1000 metres
1 hectometre (hm)	=	100 metres
1 decametre (dam)	=	10 metres

The units of length lower than metre are:

decimetre (dm), centimetre (cm) and millimetre (mm)

We have:

10 mm	=	1 cm
10 cm	=	1 dm
10 dm	=	1m

$\therefore$ 1 m = 10 dm = 100 cm = 1000 mm

All the above seven units from higher to lower level are given in the following table:

Units	km	hm	dam	m	dm	cm	mm
Value	1000 m	100 m	10 m	1 m	$\frac{1}{10}$ m	$\frac{1}{100}$ m	$\frac{1}{1000}$ m

Mainly, we shall be using the following relations:

10 mm	=	1 cm
100 cm	=	1 m
1000 m	=	1 km

Conversion from Higher to Lower Units of Length

Solved Examples

Example 1: Convert 6 km into metres.

Solution: 1 km = 1000 m

$\therefore$ 6 km = (6×1000) m = 6000 m.

Example 2: Convert 4 m into dm.

Solution: 1 m = 10 dm

$\therefore$ 4 m = (4×10) dm = 40 dm.

Example 3: Convert 5 m into cm.

Solution: 1 m = 100 cm

$\therefore$ 5 m = (5×100) cm = 500 cm.

Example 4: Convert 8 cm into mm.

Solution: 1 cm = 10 mm

$\therefore$ 8 cm = (8×10) mm = 80 mm.

Exercise 44

1. Convert each of the following into metres.

(a) 5 km (b) 18 km (c) 73 km (d) 208 km

2. Convert each of the following into dm.

(a) 8 m (b) 15 m (c) 51 m (d) 314 m

3. **Convert each of the following into cm.**

(a) 9 m (b) 17 m (c) 84 m (d) 135 m

4. **Convert each of the following into mm.**

(a) 7 cm (b) 23 cm (c) 65 cm (d) 92 cm

Conversion of Mixed Units to Lower Units of Length

Solved Examples

Example 1: Convert 3 km 25 m into metres.

Solution: We have:

3 km 25 m = 3 km + 25 m

= (3 × 1000) m + 25 m [$\because$ 1 km = 1000 m]

= 3000 m + 25 m

= 3025 m.

Example 2: Convert 6 m 8 dm into dm.

Solution: We have:

6 m 8 dm = 6 m + 8 dm

= (6 × 10) dm + 8 dm [$\because$ 1 m = 10 dm]

= 60 dm + 8 dm

= 68 dm.

Example 3: Convert 4 m 65 cm into cm.

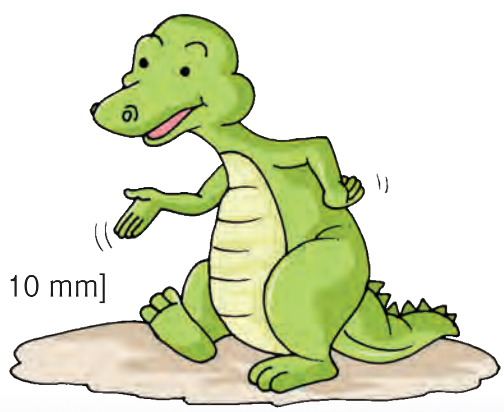
Solution: We have:

4 m 65 cm = 4 m + 65 cm

= (4 × 100) cm + 65 cm [$\because$ 1 m = 100 cm]

= 400 cm + 65 cm

= 465 cm.



Example 4: Convert 8 cm 5 mm into mm.

Solution: We have:

8 cm 5 mm = 8 cm + 5 mm

= (8 × 10) mm + 5 mm [$\because$ 1 cm = 10 mm]

= 80 mm + 5 mm

= 85 mm.

Example 5: Convert 5 km 7 hm 4 dam 3 m into metres.

Solution: We have:

5 km 7 hm 4 dam 3 m

$= 5 \text{ km} + 7 \text{ hm} + 4 \text{ dam} + 3 \text{ m}$

$= (5 \times 1000) \text{ m} + (7 \times 100) \text{ m} + (4 \times 10) \text{ m} + 3 \text{ m}$

[$\because$ 1 km = 1000 m, 1 hm = 100 m, 1 dam = 10 m]

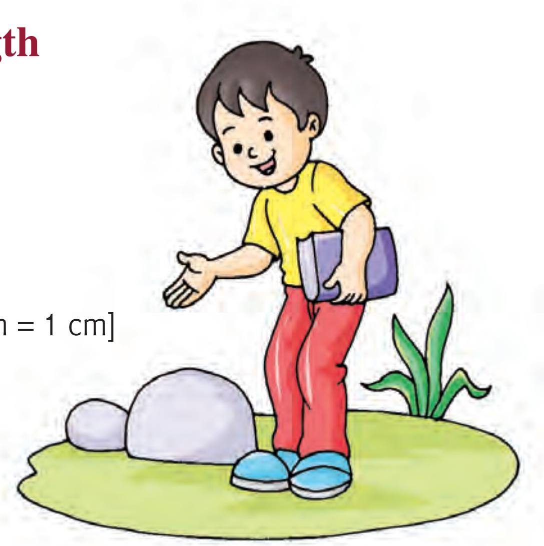
$= 5000 \text{ m} + 700 \text{ m} + 40 \text{ m} + 3 \text{ m}$

$= 5743$ m.

Exercise 45

1. **Convert each of the following into metres.**
   (a) 6 km 416 m (b) 23 km 25 m (c) 80 km 5 m
   (d) 1 km 1 m (e) 10 km 165 m (f) 100 km 10 m
2. **Convert each of the following into dm.**
   (a) 8 m 8 dm (b) 25 m 5 dm (c) 103 m 3 dm
3. **Convert each of the following into cm.**
   (a) 5 m 40 cm (b) 63 m 75 cm (c) 40 m 5 cm (d) 1 m 1 cm
4. **Convert each of the following into mm.**
   (a) 6 cm 6 mm (b) 24 cm 8 mm (c) 30 cm 1 mm (d) 83 cm 5 mm
5. **Convert each of the following into metres.**
   (a) 4 km 8 hm 5 dam 6 m (b) 12 km 6 hm 8 dam 5 m
   (c) 9 km 9 hm 9 dam 9 m (d) 1 km 1 hm 1 dam 1 m

Conversion from Lower to Higher Units of Length



Solved Examples

Example 1: Convert 80 mm into cm.

Solution: We have:

$80 \text{ mm} = (80 \div 10) \text{ cm}$ [$\because$ 10 mm = 1 cm]

$= 8$ cm.

Example 2: Convert 63 mm into cm.

Solution: We have:

$63 \text{ mm} = 60 \text{ mm} + 3 \text{ mm}$

$= (60 \div 10) \text{ cm} + 3 \text{ mm}$ [$\because$ 10 mm = 1 cm]

$= 6 \text{ cm} + 3 \text{ mm} = 6 \text{ cm } 3 \text{ mm}$.

Example 3: Convert 600 cm into metres.

Solution: We have:

600 cm = (600 ÷ 100) m [$\because$ 100 cm = 1 m]

= 6 m.

Example 4: Convert 748 cm into metres.

Solution: We have:

748 cm = 700 cm + 48 cm

= (700 ÷ 100) m + 48 cm [$\because$ 100 cm = 1 m]

= 7 m + 48 cm = 7 m 48 cm.

Example 5: Convert 8000 m into km.

Solution: We have:

8000 m = (8000 ÷ 1000) km [$\because$ 1000 m = 1 km]

= 8 km.

Example 6: Express 5165 m into km and m.

Solution: We have:

5165 m = 5000 m + 165 m

= (5000 ÷ 1000) km + 165 m [$\because$ 1000 m = 1 km]

= 5 km + 165 m = 5 km 165 m.

Example 7: Convert 4160 mm into metres and cm.

Solution: We have:

4160 mm = (4160 ÷ 10) cm [$\because$ 10 mm = 1 cm]

= 416 cm

= 400 cm + 16 cm

= (400 ÷ 100) m + 16 cm [$\because$ 100 cm = 1 m]

= 4 m + 16 cm = 4 m 16 cm.

Exercise 46

1. **Express each of the following in cm.**

(a) 70 mm (b) 85 mm (c) 64 mm (d) 14 mm

2. **Express each of the following in metres.**

(a) 400 cm (b) 900 cm (c) 520 cm (d) 165 cm

(e) 204 cm (f) 310 cm (g) 3560 cm

3. **Express each of the following in km.**

(a) 5000 m (b) 11000 m (c) 3800 m (d) 3206 m

(e) 9080 m (f) 7005 m (g) 2015 m

4. Convert 5380 mm into metres and cm.

5. **Fill in the blanks.**

(a) 1 m = ... cm (b) 1 dam = ... m

(c) 1 km = ... m (d) 1 cm = ... mm

(e) 523 cm = ... m .... cm (f) 3486 m = ... km .... m

Measures of Mass

We know that the standard unit for measuring mass is gram (g).

The other units for measuring mass are:

kilogram (kg), hectogram (hg) and decagram (dag)

decigram (dg), centigram (cg) and milligram (mg)

We have:

1 kilogram (kg)	=	1000 grams	1 decigram (dg)	=	$\frac{1}{10}$ gram
1 hectogram (hg)	=	100 grams	1 centigram (cg)	=	$\frac{1}{100}$ gram
1 decagram (dag)	=	10 grams	1 milligram (mg)	=	$\frac{1}{1000}$ gram

All the above units from higher to lower level are given in the following table:

Units	kg	hg	dag	g	dg	cg	mg
Value	1000 g	100 g	10 g	1 g	$\frac{1}{10}$ g	$\frac{1}{100}$ g	$\frac{1}{1000}$ g

Thus, we have:

1 kg = 1000 g

1 g = 1000 mg

One more important unit of mass is quintal.

1 quintal = 100 kg

Conversion from Higher to Lower Units of Mass

Solved Examples

Example 1: **Convert 6 kg into grams.**

Solution: We have:

6 kg = (6×1000) g [$\because$ 1 kg = 1000 g]

= 6000 g.

Example 2: **Convert 8 kg 235 g into grams.**

Solution: We have:

8 kg 235 g = 8 kg + 235 g

= (8×1000) g + 235 g [$\because$ 1 kg = 1000 g]

= 8000 g + 235 g = 8235 g.

Example 3: **Convert 5 kg 25 g into grams.**

Solution: We have:

5 kg 25 g = 5 kg + 25 g

= (5×1000) g + 25 g [$\because$ 1 kg = 1000 g]

= 5000 g + 25 g = 5025 g.

Example 4: **Convert 9 g into mg.**

Solution: We have:

9 g = (9×1000) mg [$\because$ 1 g = 1000 mg]

= 9000 mg.

Example 5: **Convert 4 g 30 mg into mg.**

Solution: We have:

4 g 30 mg = 4 g + 30 mg

= (4×1000) mg + 30 mg [$\because$ 1 g = 1000 mg]

= 4000 mg + 30 mg = 4030 mg.

Example 6: **Convert 6 kg 8 hg 5 dag 9 g into grams.**

Solution: We have:

6 kg 8 hg 5 dag 9 g

= 6 kg + 8 hg + 5 dag + 9 g

= (6×1000) g + (8×100) g + (5×10) g + 9 g

[$\because$ 1 kg = 1000 g, 1 hg = 100 g, 1 dag = 10 g]

= 6000 g + 800 g + 50 g + 9 g = 6859 g.

Exercise 47

1. **Convert each of the following into grams.**

   (a) 4 kg (b) 23 kg (c) 108 kg (d) 310 kg

2. **Convert each of the following into grams.**

   (a) 8 kg 125 g (b) 12 kg 30 g (c) 20 kg 5 g (d) 65 kg 250 g

3. **Convert each of the following into mg.**

   (a) 7 g (b) 63 g (c) 400 g (d) 865 g

4. **Convert each of the following into mg.**

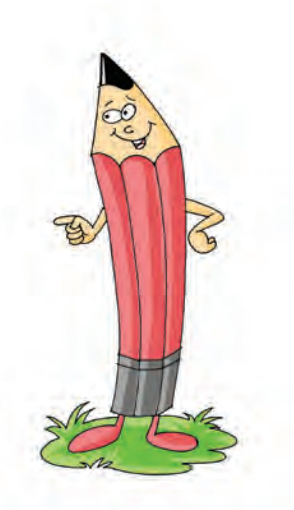
   (a) 5 g 260 mg (b) 14 g 15 mg (c) 125 g 8 mg

   (d) 1 g 1 mg (e) 10 g 10 mg (f) 100 g 50 mg

5. **Convert each of the following into grams.**

   (a) 3 kg 3 hg 3 dag 3 g (b) 5 kg 4 hg 2 dag 3 g

   (c) 1 kg 1 hg 1 dag 1 g (d) 20 kg 5 hg 8 dag 6 g



Conversion from Lower to Higher Units of Mass

Solved Examples

Example 1: Convert 25000 g to kg.

Solution: We have:

25000 g = (25000 ÷ 1000) kg [∵ 1000 g = 1 kg]

= 25 kg.

Example 2: Convert 2345 g into kg.

Solution: We have:

2345 g = 2000 g + 345 g

= (2000 ÷ 1000) kg + 345 g [∵ 1000 g = 1 kg]

= 2 kg + 345 g = 2 kg 345 g.

Example 3: Convert 5205 mg into grams and milligrams.

Solution: We have:

5205 mg = 5000 mg + 205 mg

= (5000 ÷ 1000) g + 205 mg [∵ 1000 mg = 1 g]

= 5 g + 205 mg = 5 g 205 mg.

Exercise 48

1. Convert each of the following into kg. One has been done for you.

(a) 2000 g = (..2000.. ÷ ..1000..) kg = ...2.... kg.

(b) 9000 g = (............. ÷ ....) kg = ... kg.

(c) 12000 g = (............. ÷ ....) kg = ... kg.

(d) 8000 g = (............. ÷ ....) kg = ... kg.

2. Convert each of the following into kg and g.

(a) 7300 g (b) 3460 g (c) 4508 g

(d) 3065 g (e) 2006 g

3. Convert each of the following into mg and g.

(a) 3805 mg (b) 9468 mg (c) 5550 mg

(d) 23960 mg (e) 63063 mg (f) 95010 mg

4. Fill in the blanks.

(a) 1680 g = ... kg .... g

(b) 5400 g = ... kg .... g

(c) 7020 g = ... kg .... g

(d) 8080 g = ... kg .... g

(e) 13440 mg = ... g .... mg

(f) 55055 mg = ... g .... mg

Measures of Capacity

We know that the standard unit for measuring capacity (volume) is litre (L).

The other units of capacity are:

kilolitre (kl), hectolitre (hl) and decalitre (dal)

decilitre (dl), centilitre (cl) and millilitre (ml)

We have:

10 mL = 1 cL

10 cL = 1 dL

10 dL = 1 L

$\therefore$ 1 L = 10 dL = 100 cL = 1000 mL

All the above units from higher to lower level are given in the following table:

Units	kL	hL	daL	L	dL	cL	mL
Value	1000 L	100 L	10 L	1 L	$\frac{1}{10}$ L	$\frac{1}{100}$ L	$\frac{1}{1000}$ L

Mainly, we shall be using the following relations:

1 kL = 1000 L

1 L = 1000 mL

Conversion from Higher to Lower Units of Capacity

Solved Examples

Example 1: Convert 5 kL into litres.

Solution: We have:

5 kL = (5×1000) L [$\because$ 1 kL = 1000 L]

= 5000 L.

Example 2: Convert 4 kL 320 L into litres.

Solution: We have:

4 kL 320 L = 4 kL + 320 L

= (4×1000) L + 320 L [$\because$ 1 kL = 1000 L]

= 4000 L + 320 L = 4320 L.

Example 3: Convert 3 L into mL.

Solution: We have:

3 L = (3×1000) mL [$\because$ 1 L = 1000 mL]

= 3000 mL.

Example 4: Convert 5 L 60 mL into mL.

Solution: We have:

5 L 60 mL = (5×1000) mL + 60 mL [$\because$ 1 L = 1000 mL]

= 5000 mL + 60 mL = 5060 mL.

Example 5: Convert 2 kL 5 hL 6 daL 3 L into litres.

Solution: We have:

2 kL 5 hL 6 daL 3 L

= 2 kL + 5 hL + 6 daL + 3 L

= (2×1000) L + (5×100) L + (6×10) L + 3 L

[$\because$ 1 kL = 1000 L, 1 hL = 100 L, 1 daL = 10 L]

= (2000 L + 500 L + 60 L + 3 L) = 2563 L.

Exercise 49

1. **Convert each of the following into litres.**

   (a) 8 kL (b) 50 kL (c) 132 kL

2. **Convert each of the following into litres.**

   (a) 2 kL 350 L (b) 83 kL 60 L (c) 102 kL 8 L

3. **Convert each of the following into mL.**

   (a) 5 L (b) 16 L (c) 85 L (d) 163 L

4. **Convert each of the following into mL.**

   (a) 6 L 250 mL (b) 15 L 40 mL (c) 106 L 480 mL

   (d) 34 L 6 mL (e) 3 L 3 mL

5. **Convert each of the following into litres.**

   (a) 3 kL 6 hL 4 daL 5 L (b) 12 kL 8 hL 6 daL 9 L

   (c) 1 kL 2 hL 3 daL 4 L (d) 9 kL 7 hL 8 daL 6 L

Conversion from Lower to Higher Units of Capacity

Solved Examples

Example 1: Convert 8000 L into kL.

Solution: We have:

8000 L = (8000 ÷ 1000) kL [∵ 1000 L = 1 kL]

= 8 kL.

Example 2: Convert 3475 L into kL.

Solution: We have:

3475 L = 3000 L + 475 L

= (3000 ÷ 1000) kL + 475 L [∵ 1000 L = 1 kL]

= 3 kL + 475 L = 3 kL 475 L.

Example 3: Convert 2000 mL into litres.

Solution: We have:

2000 mL = (2000 ÷ 1000) L [∵ 1000 mL = 1 L]

= 2 L.

Example 4: Convert 2025 mL into litres.

Solution: We have:

2025 mL = 2000 mL + 25 mL

= (2000 ÷ 1000) L + 25 mL [∵ 1000 mL = 1 L]

= 2 L + 25 mL = 2 L 25 mL.

Exercise 50

1. Fill in the blanks.

(a) 4000 mL = ... L (b) 8000 mL = ... L

(c) 11000 mL = ... L (d) 5000 mL = ... L

2. Fill in the blanks.

(a) 6800 mL = ... L .... mL

(b) 7250 mL = ... L .... mL

(c) 8675 mL = ... L .... mL

(d) 4080 mL = ... L .... mL

(e) 2006 mL = ... L .... mL

3. Convert each of the following into kL.

(a) 7000 L (b) 5600 L (c) 9870 L

(d) 8080 L (e) 2005 L (f) 3130 L

4. Convert each of the following into litres.

(a) 3000 mL (b) 4260 mL (c) 9675 mL

(d) 7070 mL (e) 9005 mL (f) 10010 mL

Addition and Subtraction of Length Measurements

Solved Examples

Example 1: Add: 10 m 56 cm and 8 m 34 cm.

Solution: Put the given measures in columns of m and cm (as shown) and add columnwise.

Step 1: **Add the centimetres:**

56 cm + 34 cm = 90 cm.

Write 90 under cm column.

Step 2: **Add the metres:**

10 m + 8 m = 18 m.

Write 18 under m column.

∴ Required sum = 18 m 90 cm.

	m		cm	
			1	
	1	0	5	6
+		8	3	4
	1	8	9	0

Example 2: Add: 14 m 85 cm and 19 m 65 cm.

Solution: Put the given measures in columns of m and cm (as shown) and add columnwise.

Step 1: **Add the centimetres:**

85 cm + 65 cm = 150 cm

= 100 cm + 50 cm

= 1 m + 50 cm

Write 50 under cm column and carry over 1 to m column .

Step 2: **Add the metres:**

14 m + 19 m + 1 m (carried over) = 34 m.

Write 34 under m column.

$\therefore$ Required sum = 34 m 50 cm.

	m		cm	
	1	1	1	
	1	4	8	5
+	1	9	6	5
	3	4	5	0

Example 3: Add: 8 km 675 m and 9 km 585 m.

Solution: Put the given measures in columns of km and m (as shown) and add columnwise.

Step 1: **Add the metres:**

675 m + 585 m = 1260 m

= 1000 m + 260 m

= 1 km + 260 m

Write 260 under m column and carry over 1 to km column.

Step 2: **Add the kilometres:**

8 km + 9 km + 1 km (carried over) = 18 km.

Write 18 under km column.

$\therefore$ Required sum = 18 km 260 m.

	km		m		
		1	1	1	
		8	6	7	5
+		9	5	8	5
	1	8	2	6	0

Example 4: Subtract 8 m 65 cm from 12 m 30 cm.

Solution: Put the given measures in columns of m and cm (as shown) and subtract columnwise.

Step 1: **Subtract the centimetres:**

We cannot subtract 65 cm from 30 cm.

So, we borrow 1 m, leaving behind 11 m.

And, 1 m 30 cm = 130 cm.

Now, 130 cm – 65 cm = 65 cm.

Write 65 under cm column.

Step 2: **Subtract the metres:**

11 m – 8 m = 3 m.

Write 3 under m column.

$\therefore$ Required difference = 3 m 65 cm.

	m		cm		
	1	1	1	3	0
	~~1~~	~~2~~		~~3~~	~~0~~
–		8		6	5
		3		6	5

Example 5: Subtract 16 km 246 m from 20 km 130 m.

Solution: Put the given measures in columns of km and m (as shown) and subtract columnwise.

Step 1: **Subtract the metres:**

Since 130 < 246, we cannot subtract 246 from 130.

So, we borrow 1 km, leaving behind 19 km.

1 km 130 m = 1000 m + 130 m = 1130 m.

Now, 1130 m − 246 m = 884 m.

Write 884 under m column.

Step 2: **Subtract the kilometres:**

19 km − 16 km = 3 km.

Write 3 under km column.

∴ Required difference = 3 km 884 m.

	km	m
	1 9	1 1 3 0
	~~2 0~~	~~1 3 0~~
−	1 6	2 4 6
	3	8 8 4

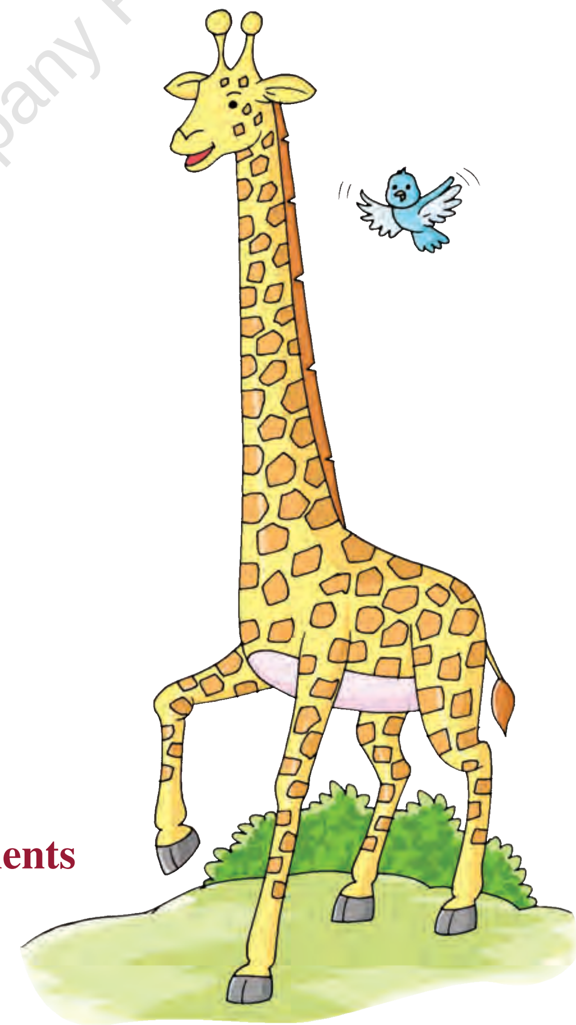
Exercise 51

Add the following.

1. 14 m 36 cm and 8 m 54 cm
2. 18 m 63 cm and 6 m 67 cm
3. 65 m 45 cm and 16 m 75 cm
4. 16 m 25 cm, 8 m 35 cm and 29 m 45 cm
5. 6 km 235 m and 5 km 875 m
6. 9 km 650 m, 16 km 240 m and 27 km 450 m

Find the difference between the following.

7. 27 m 20 cm and 19 m 60 cm
8. 28 m 37 cm and 16 m 59 cm
9. 86 km 305 m and 57 km 425 m
10. 34 km 75 m and 18 km 280 m



Addition and Subtraction of Mass Measurements

Solved Examples

Example 1: Add 31 kg 268 g and 49 kg 872 g.

Solution: Put the given measures in columns of kg and g (as shown) and add columnwise.

Step 1: **Add the grams:**

268 + 872 g = 1140 g

= 1000 g + 140 g

= 1 kg + 140 g.

Write 140 under g column and carry over 1 to kg column.

	kg		g		
		1	1	1	
	3	1	2	6	8
+	4	9	8	7	2
	8	1	1	4	0

Step 2: **Add the kilograms:**

31 kg + 49 kg + 1 kg (carried over) = 81 kg.

Write 81 under kg column.

∴ Required sum = 81 kg 140 g.

Example 2: **Add 560 g 975 mg and 187 g 75 mg.**

Solution: Put the given measures in columns of g and mg (as shown) and add columnwise.

Note that we shall write 75 mg as 075 mg.

Step 1: **Add the milligrams:**

975 mg + 075 mg = 1050 mg

= 1000 mg + 50 mg

= 1 g + 50 mg

[∵ 1000 mg = 1 g]

So, we write 50 under mg column and carry over 1 to g column.

	g			mg		
	1		1	1	1	
	5	6	0	9	7	5
+	1	8	7	0	7	5
	7	4	8	0	5	0

Step 2: **Add the grams:**

560 g + 187 g + 1 g (carried over) = 748 g.

Write 748 under g column.

∴ Required sum = 748 g 050 mg.

Example 3: **Subtract 9 kg 784 g from 25 kg 370 g.**

Solution: Put the given measures in columns of kg and g (as shown) and subtract columnwise.

Step 1: **Subtract the grams:**

Since 370 < 784, we cannot subtract 784 g from 370 g.

So, we borrow 1 kg, leaving behind 24 kg.

Taking 1 kg from kg column to g column, we get:

1 kg 370 g = 1000 g + 370 g = 1370 g.

Now, 1370 g – 784 g = 586 g.

Write 586 under g column.

	kg		g			
	2	4	1	3	7	0
	~~2~~	~~5~~		~~3~~	~~7~~	~~0~~
–		9		7	8	4
	1	5		5	8	6

Step 2: **Subtract the kilograms:**

24 kg – 9 kg = 15 kg.

Write 15 under kg column.

Required difference = 15 kg 586 g.

Example 4: Subtract 8 kg 265 g from 15 kg 50 g.

Solution: Put the given measures in columns of kg and g (as shown) and subtract columnwise.

Step 1: **Subtract the grams:**

Since 50 < 265, we cannot subtract 265 g from 50 g.

So, we borrow 1 kg, leaving behind 14 kg.

Taking 1 kg from kg column to g column, we get:

1 kg + 050 g = 1000 g + 050 g = 1050 g.

Now, 1050 g – 265 g = 785 g.

Write 785 under g column.

	kg	g
	1 4	1 0 5 0
	~~1 5~~	~~0 5 0~~
–	8	2 6 5
	6	7 8 5

Step 2: **Subtract the kilograms:**

14 kg – 8 kg = 6 kg.

Write 6 under kg column.

∴ Required difference = 6 kg 785 g.

Example 5: Subtract 485 g 865 mg from 500 g 30 mg.

Solution: Put the given measures in columns of g and mg (as shown) and subtract columnwise.

Step 1: **Subtract the milligrams:**

Since 030 < 865, we cannot subtract 865 mg from 30 mg.

So, we borrow 1 g, leaving behind 499 g.

Taking this to mg column, we get:

1 g + 030 mg = 1000 mg + 30 mg = 1030 mg.

Now, 1030 mg – 865 mg = 165 mg.

Write 165 under mg column.

	g	mg
	4 9 9	1 0 3 0
	~~5 0 0~~	~~0 3 0~~
–	4 8 5	8 6 5
	1 4	1 6 5

Step 2: **Subtract the grams:**

499 g – 485 g = 14 g.

Write 14 under g column.

∴ Required difference = 14 g 165 mg.

Exercise 52

Add the following.

1. 23 kg 265 g and 16 kg 555 g
2. 18 kg 340 g and 11 kg 660 g
3. 41 kg 584 g and 32 kg 746 g
4. 10 kg 375 g, 8 kg 285 g and 6 kg 780 g
5. 15 kg 750 g, 6 kg 350 g and 4 kg 950 g
6. 340 g 860 mg and 165 g 440 mg
7. 695 g 755 mg and 245 g 085 mg
8. 275 g 468 mg and 345 g 672 mg

Find the difference between the following.

9. 26 kg 540 g and 18 kg 860 g
10. 32 kg 80 g and 23 kg 985 g
11. 8 kg 675 g and 22 kg 360 g
12. 15 g 387 mg and 20 g 40 mg
13. 1 quintal and 375 kg

Addition and Subtraction of Capacity Measurements

Example 1: Add 27 L 950 mL and 10 L 65 mL.

Solution: Put the given measures in columns of L and mL (as shown) and add columnwise.

Step 1: **Add the miligrams:**

950 mL + 065 mL = 1015 mL

= 1000 mL + 15 mL

= 1 L + 15 mL.

Write 15 under mL column and carry over 1 to L column.

	L		mL		
		1	1		
	2	7	9	5	0
+	1	0	0	6	5
	3	8	0	1	5

Step 2: **Add the litres:**

27 L + 10 L + 1 L (carried over) = 38 L.

∴ Required sum = 38 L 015 mL.

Example 2: Subtract 16 L 485 mL from 21 L 40 mL.

Solution: Put the given measures in columns of L and mL (as shown) and subtract columnwise.

Step 1: **Subtract the miligrams:**

Since 485 > 040, we cannot subtract 485 mL from 040 mL.

So, we borrow 1 L, leaving behind 20 L.

Taking 1 L from L column to mL column, we get:

1 L + 040 mL = 1000 mL + 040 mL

= 1040 mL.

Now, 1040 mL – 485 mL = 555 mL.

Write 555 under mL column.

Step 2: **Subtract the litres:**

20 L – 16 L = 4 L.

Write 4 under L column.

Required difference = 4 L 555 mL.

	L		mL			
	2	0	1	0	4	0
	~~2~~	~~1~~		~~0~~	~~4~~	~~0~~
–	1	6		4	8	5
		4		5	5	5

Exercise 53

Add the following measurements.

1. 15 L 625 mL and 8 L 360 mL
2. 23 L 865 mL and 11 L 385 mL
3. 36 L 070 mL and 24 L 930 mL
4. 40 L 286 mL and 35 L 714 mL
5. 5 L 065 mL and 8 L 985 mL

Find the difference between the following measurements.

6. 18 L 580 mL and 8 L 430 mL
7. 20 L 000 mL and 14 L 135 mL
8. 24 L 090 mL and 16 L 285 mL
9. 32 L 060 mL and 18 L 985 mL
10. 40 L 120 mL and 20 L 275 mL
11. 10 L 200 mL and 7 L 375 mL

Word Problems

Exercise 54

1. Amit travels 8 km 60 m by bus and 2 km 750 m by auto to reach his school from his home. How far is his school from his home?
2. A bucket contains 16 L 725 mL of milk. Another bucket contains 4 L 685 mL of milk more. How much of milk is contained in the second bucket?
3. A dairy sold 56 L 750 mL, 84 L 650 mL and 75 L 50 mL of milk during three consecutive days of a week. What was the total sale of milk in this dairy during these three days?
4. One day Rita's mother bought 6 kg 625 g of apples, 3 kg 650 g of guava and 5 kg 725 g of oranges. What is the total mass of fruits bought by her on that day?
5. From a roll of 125 m long electric wire, a piece of 17 m 65 cm is cut. What length of wire is left on the roll?

6. On Meena's birthday, her father bought 6 L 50 mL of milk from a dairy. During the day 4 L 765 mL was used. How much of milk was not used?
7. Out of a tin of 16 kg of refined oil, 9 kg 50 g has been consumed. How much oil is left in the tin?
8. The monthly consumption of sugar in Mr Pande's family is 10 kg 50 g. Mr Verma's family consumes 9 kg 825 g of sugar every month. Which family has more consumption of sugar and by how much?

Things to Remember

1. The standard unit for measuring length is metre.
2. The other units of length are: Kilometre (km), Hectometre (hm), Decametre (dam), Decimetre (cm), Centimetre (cm), Millimetre (mm).
3.

1 km	=	1000 m	1 dm	=	$\frac{1}{10}$ m	10 mm	=	1 cm
1 hm	=	100 m	1 cm	=	$\frac{1}{100}$ m	10 hm	=	1 dm
1 dam	=	10 m	1 mm	=	$\frac{1}{1000}$ m	10 dm	=	1 m

4. 1 m = 100 cm = 1000 mm.
5. The standard unit for measuring mass is gram.
6. The other units of mass are: Kilogram (kg), Hectogram (hg), Decagram (dag), Decigram (dg), Centigram (cg), Milligram (mg).
7.

1 kg	=	1000 g	1 dg	=	$\frac{1}{10}$ g	10 mg	=	1 cm
1 hg	=	100 g	1 cg	=	$\frac{1}{100}$ g	10 cg	=	1 dg
1 dag	=	10 g	1 mg	=	$\frac{1}{1000}$ g	10 dg	=	1 g

8. 1 kg = 1000 g and 1 quintal = 100 kg.
9. The standard unit for measuring capacity is litre.
10. The other units of capacity are:

Kilolitre (kL), Hectolitre (hL), Decalitre (daL), Decilitre (dL), Centilitre (cL), Millilitre (mL).

1 kL	=	1000 L	1 dL	=	$\frac{1}{10}$ L	10 mL	=	1 cL
1 hL	=	100 L	1 cL	=	$\frac{1}{100}$ L	10 cL	=	1 dL
1 daL	=	10 L	1 mL	=	$\frac{1}{1000}$ L	10 dL	=	1 L

C.C.E. Drill 10

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. To convert a length given in km into metres, we
(a) divide by 100 (b) multiply by 100
(c) divide by 1000 (d) multiply by 1000

2. Milk in a spoon is almost
(a) 5 mL (b) 15 mL (c) 20 mL (d) 50 mL

3. 1 quintal = ______ kg
(a) 10 (b) 100 (c) 1000 (d) None of these

4. 8 m 9 cm = ______ cm
(a) 809 (b) 890 (c) 8009 (d) 8090

5. Which of the following is likely to have a capacity of 200 litres?
(a) A cup (b) A pressure cooker
(c) A water tank (d) A pond

6. Which is the best unit to measure the length of a 10-rupee note?
(a) mm (b) cm (c) m (d) km

7. 10 cm = 1.........
(a) m (b) mm (c) dm (d) hm

8. 5 dL 5 mL = ______ mL
(a) 55 (b) 505 (c) 550 (d) 5005

9. How many 250 g sugar packets are required to make 2 kg?
(a) 4 (b) 8 (c) 10 (d) 12

10. Rahul measured the height of a wall in his house. Which is the best metric unit of measure to use?
(a) millimetres (b) centimetres (c) metres (d) kilometres

11. 6 cm 4 mm = ______ mm
(a) 64 (b) 604 (c) 640 (d) 10

12. 10 kg 60 g = ______ g
(a) 1060 (b) 1006 (c) 10060 (d) 10600

13. 8 cm 2 mm + 2 cm 8 mm = ...
(a) 10 cm 2 mm (b) 10 cm 8 mm (c) 10 cm (d) 11 cm

14. Out of a sack of 50 kg of rice, 27 kg 650 g was used in a restaurant during a certain month. How much rice is left in the sack?
(a) 22 kg 350 g (b) 23 kg 350 g (c) 22 kg 650 g (d) 23 kg 450 g

QUESTION BAG 2

1. Fill in the blanks.

(a) 15 km = ...m
(b) 26 m = ...dm
(c) 160 m = ...cm
(d) 81 m = ...mm
(e) 99 cm = ...mm
(f) 77 dm = ...mm
(g) 68 hm = ...m
(h) 50 dam = ...m
(i) 18 km 18 m = ...m
(j) 6 m 42 dm = ...dm
(k) 200 m 80 cm = ...cm
(l) 20 cm 2 mm = ...mm
(m) 63 cm 6 mm = ...mm

2. Fill in the blanks.

(a) 50 kg = ...g
(b) 1300 kg = ...g
(c) 18 kg 10 g = ...g
(d) 105 kg 200 g = ...g
(e) 40 kg 70 g = ...g
(f) 100 g = ...mg
(g) 80 g 80 mg = ...mg
(h) 250 g 5 mg = ...mg

3. Fill in the blanks.

(a) 65 L = ...mL
(b) 900 L = ...mL
(c) 55 L 5 mL = ...mL
(d) 80 L 80 mL = ...mL
(e) 200 kL = ...L
(f) 10 kL 10 L = ...L

4. Fill in the blanks.

(a) 84 mm = ... cm ......mm
(b) 796 cm = ... m......cm
(c) 3456 m = ... km......m
(d) 9090 m = ... km......m
(e) 352 dm = ...m......dm
(f) 6066 g = ...kg......g
(g) 5208 mg = ...g......mg
(h) 6372 mL = ...L......mL

5. Add:

(a)

	kg	g	mg
	5	6 2 5	8 7 5
+	8	3 8 5	5 4 5

(b)

	m	cm	mm
	2 8	8 8	7
+	5 4	2 4	8

(c)

	km	m	cm
	1 3	7 6 4	3 6
+	2 9	3 8 8	8 6

(d)

	kL	L	mL
	9	3 8 7	5 6 5
+	8	6 9 6	7 8 5

6. Rita's pencil is 8 cm 2 mm long and Nisha's pencil is 5 cm 7 mm long. By what length is Rita's pencil longer?

7. The distance between two cities is 402 km. Ajay travelled 256 km 565 m by bus and the rest of the distance by car. How much distance did he travel by car?

8. A school uniform shop had 182 m 42 cm cloth for making skirts, out of which 95 m 65 cm cloth was used. How much cloth is left?

9. A tin can hold 16 L 675 mL kerosene. It has 10 L 785 mL of kerosene. How much more kerosene is required to fill it to its capacity?

13 Unitary Method

Introduction

The unitary method is also known as the method of ones.

A very simple principle of this method is:

To get more value, we multiply.

To get less value, we divide.

The following examples will make the ideas more clear.

Example 1: The cost of one almirah is ₹ 3575. Find the cost of 8 almirahs.

Solution: Clearly, more almirahs will cost more.

And, more we get on multiplying.

Cost of 1 almirah = ₹ 3575.

Cost of 8 almirahs = ₹ (3575×8) [more almirahs, more cost]

= ₹ 28600.

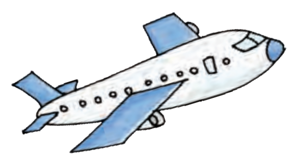
Hence, the cost of 8 almirahs is ₹ 28600.

From the above example, we conclude the following:

Rule 1: If the cost of one item is given, we can determine the cost of any number of similar items by multiplying the cost with the given number of items.

Example 2: An aeroplane is flying at a speed of 785 km per hour. How much distance will it cover in 16 hours?

Solution: Clearly, in more hours it will cover more distance.



And, more we get on multiplying.

Distance covered in 1 hour = 785 km.

Distance covered in 16 hours = (785×16) km [more hours, more distance]

= 12560 km.

Hence, the distance covered by the aeroplane in 16 hours is 12560 km.

Example 3: The cost of 17 books is ₹ 1445. Find the cost of one book.

Solution: Clearly, less books will cost less.

And, less we get on dividing.

Cost of 17 books = ₹ 1445

∴ Cost of 1 book = ₹ $(1445 \div 17)$ [less books, less cost]

= ₹ 85.

Hence, the cost of 1 book is ₹ 85.

From the above example, we conclude the following:

Rule 2: If the total cost of a number of items of the same kind is given, we can determine the cost of one item by dividing the total cost by the given number of items.

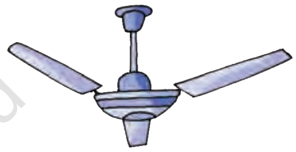
Example 4: 13 trucks can carry 5447 bags of cement. How many bags of cement can be carried in 1 truck?

Solution: Number of bags carried by 13 trucks = 5447.

Number of bags carried by 1 truck = $5447 \div 13 = 419$.

Hence, one truck can carry 419 bags of cement.

Example 5: 8 fans cost ₹ 13480. What is the cost of 13 fans?



Solution: Clearly, less fans will cost less.

And, more fans will cost more.

Cost of 8 fans = ₹ 13480.

Cost of 1 fan = ₹ $(13480 \div 8)$ [less fans, less cost]

= ₹ 1685.

Cost of 13 fans = ₹ (1685×13) [more fans, more cost]

= ₹ 21905.

Hence, the cost of 13 fans is ₹ 21905.

From the above example, we conclude the following:

Rule 3: When the cost of a certain number of items of the same type is given and we have to calculate the cost of another number of those items, we first determine the cost of one item and then multiply the result by the required number of items.

Example 6: A car runs 234 km on 18 litres of diesel. How many kilometres can it run on 43 litres of diesel?

Solution: Clearly, less is the consumption of diesel, less distance will be covered.

And, more is the consumption of diesel, more distance will be covered.

Distance covered on 18 litres of diesel = 234 km.

Distance covered on 1 litre of diesel = $(234 \div 18)$ km = 13 km.

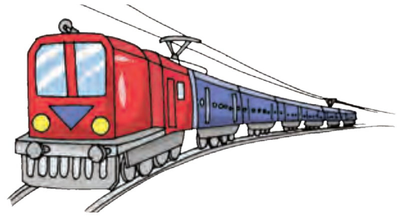
[less diesel, less distance]

Distance covered on 43 litres of diesel = (13×43) km = 559 km.

[more diesel, more distance]

Hence, the car can run 559 km on 43 litres of diesel.

Example 7: **A train is running at a uniform speed. It covers 1215 km in 9 hours. How much distance will it cover in 19 hours?**



Solution: Clearly, in less hours, less distance will be covered.

And, in more hours, more distance will be covered.

Distance covered in 9 hours = 1215 km.

Distance covered in 1 hour = (1215 ÷ 9) km [less hours, less distance]

= 135 km.

Distance covered in 19 hours = (135 × 19) km [more hours, more distance]

= 2565 km.

Hence, the train will cover 2565 km in 19 hours.

Example 8: **A shopkeeper sold 136 almirahs for ₹ 3784 each. From the money so received, he bought 34 refrigerators. What is the cost of each refrigerator?**

Solution: More almirahs will cost more.

Cost of 1 almirah = ₹ 3784.

Cost of 136 almirahs = ₹ (3784 × 136)

= ₹ 514624.

$$\begin{array}{r} 3784 \\ \times\ 136 \\ \hline 22704 \\ 113520 \\ +\ 378400 \\ \hline 514624 \end{array}$$

Now, less refrigerators will cost less.

Cost of 34 refrigerators = ₹ 514624.

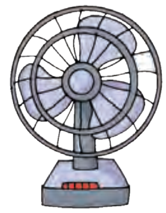
Cost of 1 refrigerator = ₹ (514624 ÷ 34)

$$\begin{array}{r} 15136 \\ 34\,\overline{)\,514624} \\ -34 \\ \hline 174 \\ -170 \\ \hline 46 \\ -34 \\ \hline 122 \\ -102 \\ \hline 204 \\ -204 \\ \hline 0 \\ \hline \end{array}$$

Hence, the cost of each refrigerator is ₹ 15136.

Exercise 55

1. The cost of 1 bicycle is ₹ 1475. Find the cost of 23 bicycles.
2. A man makes 87 toys in 1 day. How many toys does he make in four weeks?
3. Buttons are packed in packets of 576 each. How many buttons are there in 48 such packets?
4. The consumption of petrol in a scooter is 54 km per litre. How much distance it can cover on 29 litres of petrol?
5. The price of 17 table fans is ₹ 6545. What is the cost of 1 table fan? What is the cost of 8 table fans?



6. Three planes can carry 1185 passengers. How many passengers can be carried in 8 planes?
7. 2250 clips are equally packed in 18 packets. How many clips are there in 13 packets?
8. A car covers 2025 km in 25 hours. How much distance does it cover in 18 hours?
9. An off-set printing machine prints 37600 forms in 16 hours. How many forms does it print in 25 hours?
10. A factory produces 6816 motor horns in 12 days. How many horns does it produce in three weeks?
11. If 13 buses can carry 715 passengers, how many passengers can be carried in 25 buses?
12. A car runs 285 km on 15 litres of petrol. How many kilometres can it run on 22 litres of petrol?

13. The annual rent of a house is ₹ 58500. What is its rent for 17 months?
14. A worker earned ₹ 1080 in 8 days. How much did he earn in 3 days?

Things to Remember

The principle of unitary method is:

1. To get more value, we multiply.
2. To get less value, we divide.

C.C.E. Drill 11

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. Mr Roy saves ₹ 250 every month. How much money will he save in 1 year?
   (a) ₹ 2500 (b) ₹ 2600 (c) ₹ 3000 (d) ₹ 3500
2. A cricketer scores 58 runs from 29 balls. How many runs does he score in 4 balls?
   (a) 6 (b) 8 (c) 10 (d) 12
3. The cost of a train ticket is ₹ 586. The cost of 25 tickets is
   (a) ₹ 14560 (b) ₹ 14620 (c) ₹ 14650 (d) ₹ 14780
4. The cost of 6 books is ₹ 120. What is the cost of 4 books?
   (a) ₹ 60 (b) ₹ 70 (c) ₹ 80 (d) ₹ 90
5. The price of 1 dozen oranges is ₹ 96. What is the price of 10 oranges?
   (a) ₹ 75 (b) ₹ 80 (c) ₹ 90 (d) ₹ 960
6. A car is running at a uniform speed of 60 km per hour. In how many hours will it cover 1140 km?
   (a) 18 (b) 19 (c) 24 (d) 29

QUESTION BAG 2

1. **Fill in the blanks.**
   (a) A factory makes 4200 toy cars in a week.
   In 1 day it makes ....toy cars.
   In 18 days it makes ....toy cars.
   (b) 8 crates of apples weigh 208 kg.
   1 crate weighs .... kg.
   25 crates weigh .... kg.
   (c) 1 dozen shirts cost ₹ 4752.
   Each shirt costs ₹ ....
   50 shirts cost ₹ ....

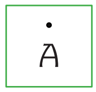
2. If it takes 72 minutes to fill 12 buckets of water, how long will it take to fill 9 buckets?
3. A car company produces 285 cars in 3 days. How many cars will be manufactured in 25 days?
4. There are 2275 trees in 25 rows. How many trees are there in 72 rows?
5. If the cost of 15 watches is ₹ 5250, what is the cost of 38 such watches?

14 Geometry

Point, Line Segment, Line and Ray

Point: A point is an exact location.

A fine dot represents a point.



Point

In the adjoining figure, A is a point.

Line Segment: Let A and B be two points.

The straight path from A to B is called the line segment AB, denoted by $\overline{AB}$.

The points A and B are called the end points of $\overline{AB}$.

The distance between the points A and B is called the length of $\overline{AB}$.

Thus, a line segment has a length which can be measured.

The edges of a table, the edges of a ruler etc. are examples of line segments.

Line: A line is an endless straight path that extends in both directions.

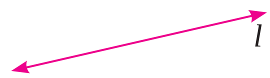
A line has no end points.

A line segment $\overline{AB}$ extended on both sides and marked by arrow marks on both the ends represents a line, denoted by $\overleftrightarrow{AB}$.

Arrows in opposite directions indicate that the line is endless.

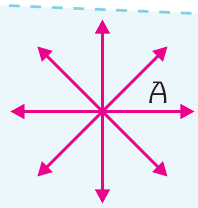
Sometimes a line is represented by a small letter *l*, m, n, etc.

In the adjoining figure, *l* is a line.



Points to Remember

1. An infinite number of lines can be drawn to pass through a given point.



2. One and only one line can be drawn to pass through two given points A and B.

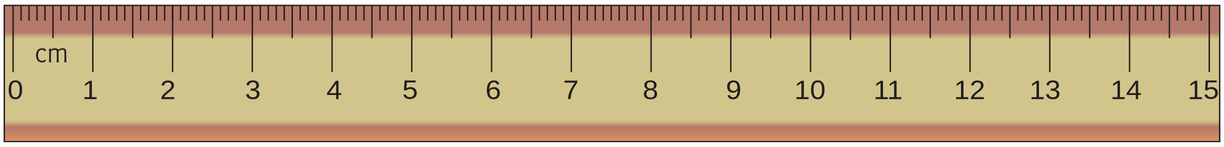
Ray: A ray is a straight path having one end and extending endlessly in one direction only.

The end point of a ray is called its initial point.

In the adjoining figure, $\overrightarrow{AB}$ is a ray. A is the initial point of ray $\overrightarrow{AB}$.

Measuring Line Segments

To measure a line segment we use a ruler or scale. One edge of a ruler is marked in centimetres (cm) as shown below.



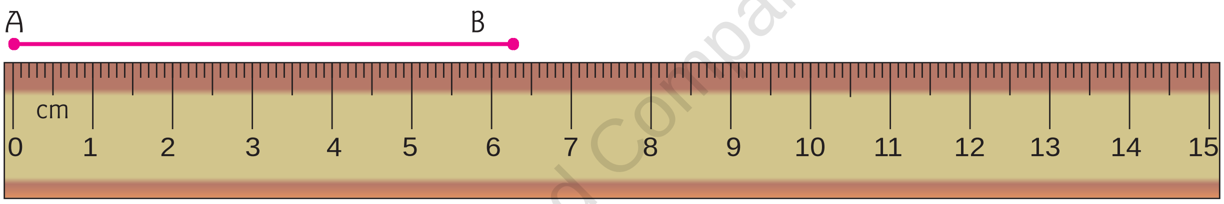
Each centimetre is divided into 10 equal small divisions. Each small division is called a millimetre (mm).

Thus, $\boxed{1 \text{ cm} = 10 \text{ mm}}$

Example: Measure the length of the given line segment $\overline{AB}$.

Method: Place the edge of the ruler along line segment AB, keeping the zero centimetre mark of the ruler at point A.

Read the mark on the ruler at point B.



We observe that the end point B is 3 small divisions ahead of the 6 cm mark.

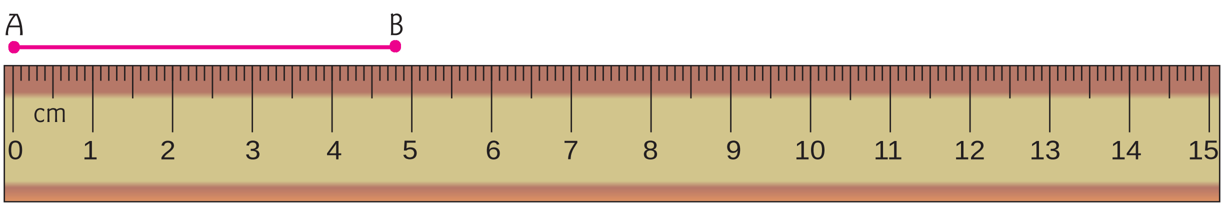
So, the length of $\overline{AB}$ is 6 cm 3 mm or 6.3 cm.

To draw a line segment of a given length

Example: Draw a line segment of length 4.8 cm.

Method: Place the ruler on the plane of the paper and hold it firmly.

Mark a point with a fine pencil against the zero centimetre mark of the ruler. Name it point A. By sliding the pencil gently along the edge of the ruler draw a line segment upto the mark, 8 small divisions ahead of the 4 cm mark on the ruler. Name the point against 4.8 cm mark as B.

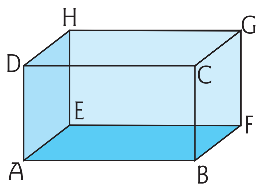


Then, $\overline{AB}$ = 4.8 cm or 4 cm 8 mm.

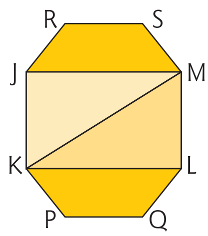
Exercise 56

1. **Count the number of line segments, and also name them in each of the following figures.**

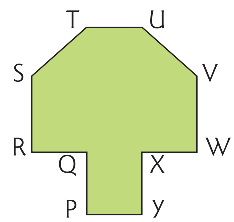
(a)



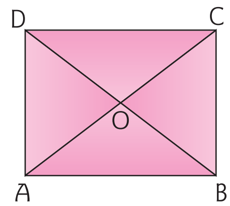
(b)



(c)



(d)



2. **Fill in the blanks.**

(a) A line segment has .... end points.

(b) A ray has .... end point.

(c) A line has .... end point.

(d) In ray $\overrightarrow{PQ}$, the initial point is .... while in ray $\overrightarrow{QP}$, the initial point is ....

(e) A .... has a definite length.

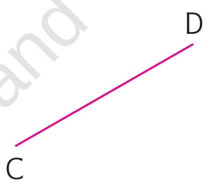
(f) A .... has no length, breadth or thickness.

3. **Measure the following line segments and fill in the blanks.**

(a)

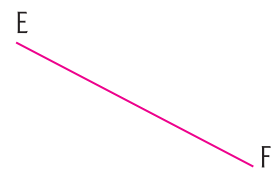
$\overline{AB}$ = ...

(b)



$\overline{CD}$ = ...

(c)



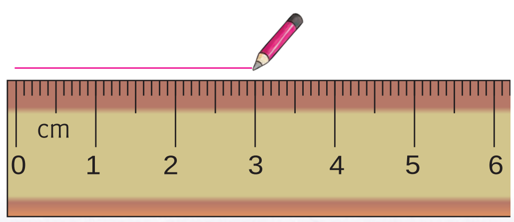
$\overline{EF}$ = ...

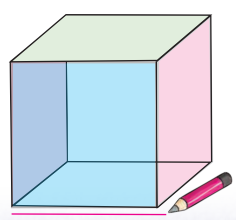
4. **With the help of a ruler draw a line segment of length.**

(a) 7 cm (b) 6 cm 8 mm (c) 8.6 cm (d) 7.5 cm

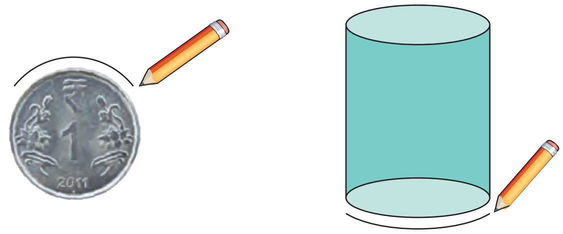
Straight and Curved Lines

You must have seen that by moving a pencil along objects with straight edges such as a ruler, a dice, a pencil-box, etc., we get a straight line.



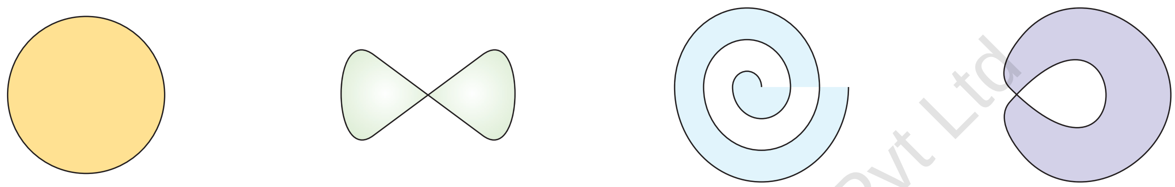


Similarly, by moving a pencil along a curved edge of a coin or the lid of a tin, we get a curved line.

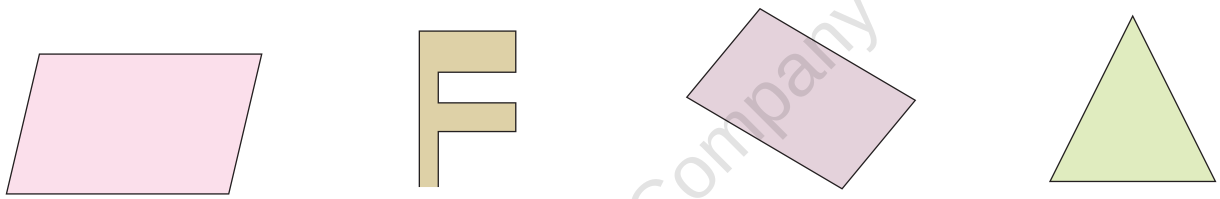


Curves: The figures traced out with the help of the sharp edge of a pencil without lifting the pencil are called curves.

Here are some examples of curves.



(a) (b) (c) (d)



(e) (f) (g) (h)

Closed and Open Figures

You must have noticed that in the above figure, curves (a), (b), (d), (e), (g) and (h) begin and end at the same point. Such curves are called closed figures.

On the other hand, curves (c) and (f) do not end at the starting point. Such curves are called open figures.

Simple Closed Figure

A closed figure which does not intersect itself is called a simple closed figures.

Thus, curves (a), (e), (g) and (h) are simple closed figures.

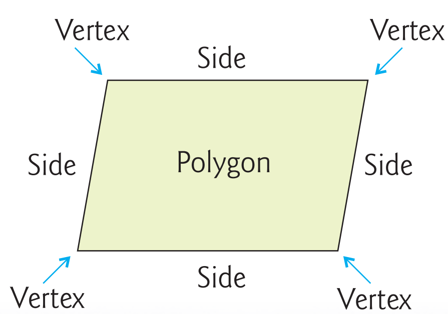
Polygons

A simple closed figure formed of three or more line segments is called a polygon.

The line segments which form a polygon are called its sides.

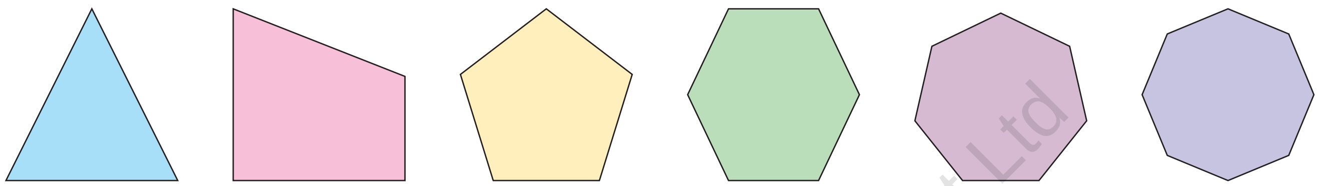
The point at which two adjacent sides of a polygon meet, is called a vertex of the polygon. The plural of vertex is vertices.

The polygon shown here has 4 sides and 4 vertices.



Types of Polygons

1. A polygon with 3 sides is called a triangle;
2. A polygon with 4 sides is called a quadrilateral;
3. A polygon with 5 sides is called a pentagon;
4. A polygon with 6 sides is called a hexagon;
5. A polygon with 7 sides is called a heptagon;
6. A polygon with 8 sides is called an octagon; and so on.



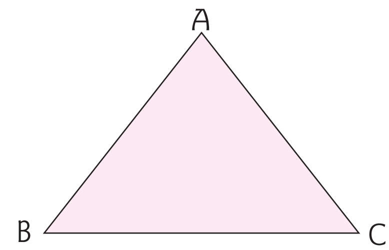
Triangles

A simple closed figure bounded by three line segments is called a triangle.

In the given figure, ABC is a triangle. It has:

(a) 3 sides, namely AB, BC and CA;

(b) 3 vertices, namely A, B and C.



The symbol for triangle is △.

Thus, △ ABC means triangle ABC.

It may be noted here that in describing a triangle we may name the vertices in any of the following orders:

△ABC, △BCA, △CAB, △BAC, △ACB and △CBA.

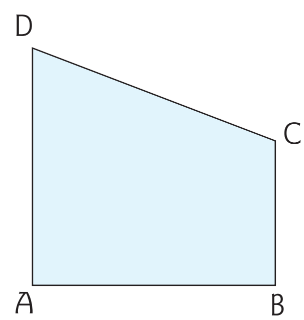
Quadrilaterals

A simple closed figure bounded by four line segments is called a quadrilateral.

In the given figure, ABCD is a quadrilateral. It has:

(a) 4 vertices, namely A, B, C and D;

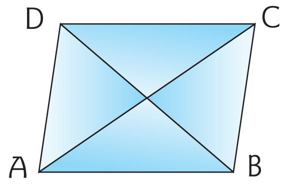
(b) 4 sides, namely AB, BC, CD and DA.



Adjacent Sides: The sides of the quadrilateral having a common vertex are called its adjacent sides.

Thus, AB and BC; BC and CD; CD and DA; DA and AB form pairs of adjacent sides in the quadrilateral ABCD.

Opposite Sides: In a quadrilateral ABCD,



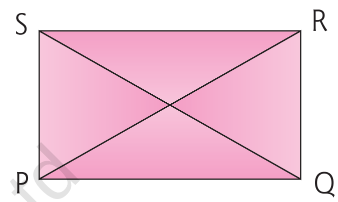
AB and CD make one pair of opposite sides.

BC and AD make another pair of opposite sides.

Diagonals: The line segments joining the opposite vertices of a quadrilateral are called its diagonals.

Thus, a quadrilateral ABCD has two diagonals, namely AC and BD.

Rectangle



A rectangle is a special type of a quadrilateral, in which:

(a) opposite sides are equal.

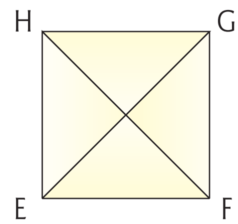
(b) diagonals are equal.

In the adjoining figure, quadrilateral PQRS is a rectangle, as:

(a) PQ = RS and PS = QR.

(b) PR = QS.

Square



A square is a special type of rectangle, in which all the four sides are equal.

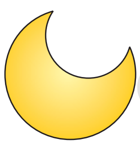
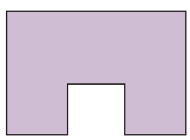
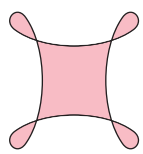
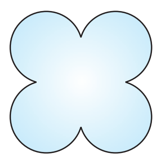
The diagonals of a square are also equal.

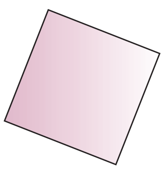
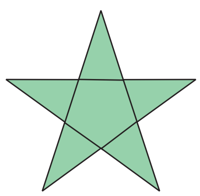
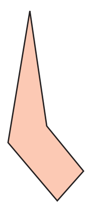
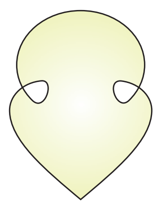
The adjoining figure shows a rectangle in which EF = FG = GH = EH.

So, EFGH is a square. Clearly, EG = FH.

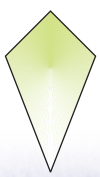
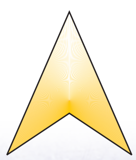
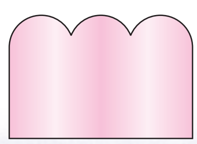
Exercise 57

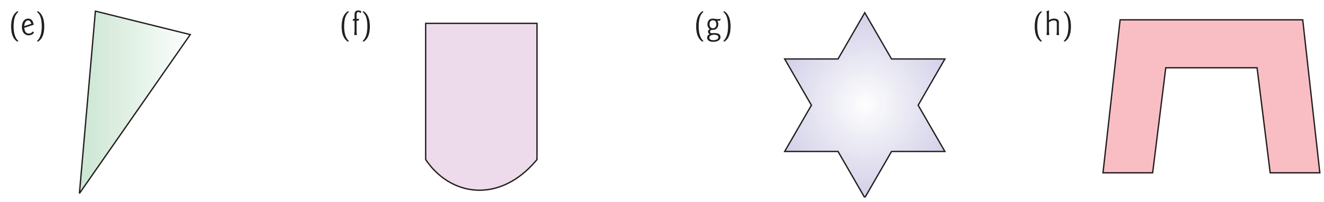
1. **Which of the following are simple closed curves?**

(a) 
(b) 
(c) 
(d) 

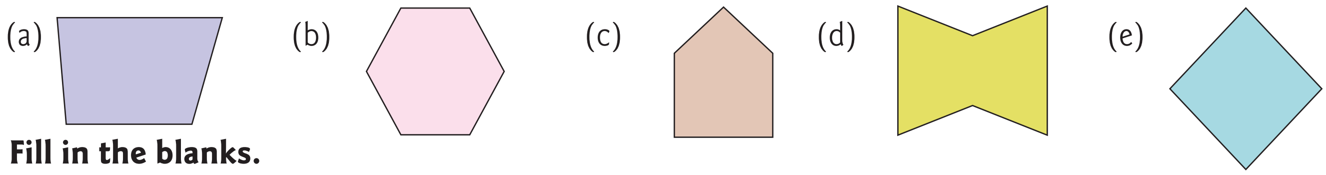
(e) 
(f) 
(g) 
(h) 

2. **Which of the following figures are polygons?**

(a) 
(b) 
(c) 
(d) 



3. Which of the following polygons are quadrilaterals?



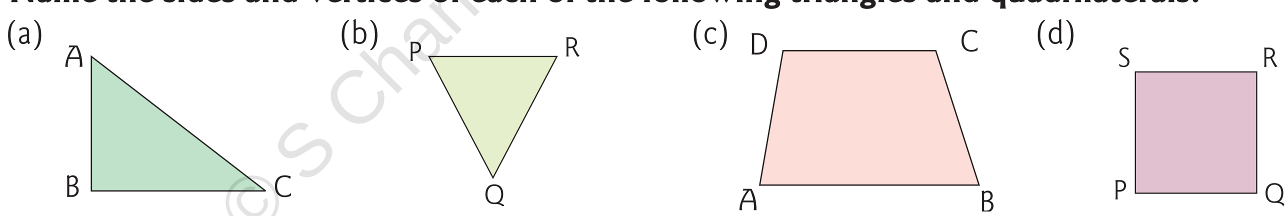
4. Fill in the blanks.

(a) A polygon is a figure formed by more than .... line segments.
(b) A polygon formed of only three line segments is called a ....
(c) A polygon formed of only four line segments is called a ....
(d) A triangle has .... vertices and .... sides.
(e) A quadrilateral has .... vertices and .... sides.
(f) A curve which ends at the starting point is called a ....
(g) The diagonals of a quadrilateral are equal.
Then, this quadrilateral is either a .... or a ....
(h) In a rectangle, the pairs of .... sides are equal.
(i) A point where two sides of a polygon meet is called its ....

5. State whether each of the following statements is true or false.

(a) Every square is a rectangle. ....
(b) All quadrilaterals are rectangles. ....
(c) The diagonals of a quadrilateral are always equal. ....
(d) The opposite sides of a quadrilateral may have a common vertex. ....

6. Name the sides and vertices of each of the following triangles and quadrilaterals.



7. Draw a quadrilateral. Name it PQRS. Write the names of the four sides and two diagonals.

Circle

Activity

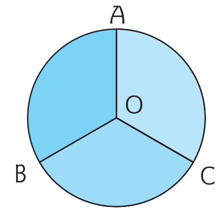
Place a one-rupee coin on a paper and with a sharp-edged pencil, starting from a point, trace its boundary on the paper, till your pencil reaches the starting point. You obtain a figure as shown herewith. This is a circle.

This is why we call a bangle, a wheel, a coin, circular objects.

We shall now define a circle geometrically and study its various elements.

Definition: A circle is a closed figure each of whose points is equidistant from a fixed point inside it.

This fixed point is called the centre of the circle.



In the figure shown here, O is the centre of circle.

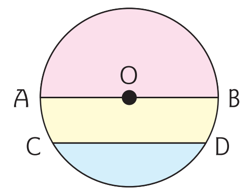
A, B, C are any three points on the circle. All the three points are at the same distance from O. So, OA = OB = OC.

Radius: The distance between the centre of a circle and any point on it is called its radius.

Thus, each of the line segments OA, OB and OC represents a radius of the circle.

The plural of radius is radii.

All the radii of a circle are equal in length.



Chord: A line segment that joins two points on a circle is called a chord of the circle.

In the adjoining figure, AB and CD are two chords of the circle.

Diameter: A chord which passes through the centre of the circle is called a diameter of the circle.

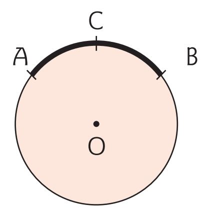
Thus, in the above figure, AB is a diameter of the circle.

Diameter is the longest chord of a circle.

Note here that AB = AO + OB

= 2 × AO [∵ AO = OB = radius]

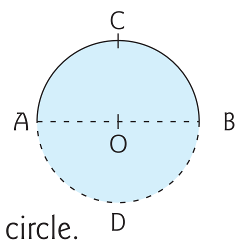
∴ **Diameter = 2 × Radius**



Arc: Any part of a circle is called an arc.

Usually, we name an arc by three points, out of which two are the end points of the arc and third one is the point in between them.

In the given figure, ACB is an arc of the given circle.



Semicircle: Half of a circle is called a semicircle.

Thus, in the given figure, ACB is a semicircle and ADB is also a semicircle. Note that a semicircle is also an arc of the circle.

Circumference: The length of the boundary of a circle is called the circumference of the circle.

Activity

Place a bangle on a paper and trace out its boundary with a pencil, to form a circle. Now, take a thread and place it along the circle till the two ends of the thread meet. The length of this thread gives us the circumference of this circle.

To draw a circle of given radius

Example: **Draw a circle of radius 3 cm.**

Method: We can draw a circle with the help of compass contained in your geomerty box.

A compass has two legs.

One leg has the steel end.

To another leg a pencil is fixed by means of a screw in such a way that the pencil end and the steel end are at the same level.

Step 1: Open the legs of the compass to 3 cm length, using the ruler. (Fig. 1)

Step 2: Mark any point O on the plane of the paper.

Step 3: Place the steel end of the compass at the point O.

Step 4: Hold the head of the compass between the thumb and the fore finger such that the pencil end touches the paper.

Now turn it completely round so that the pencil end traces a circle. (Fig. 2)

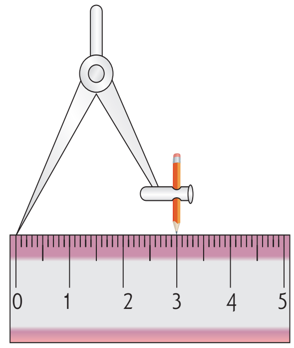


Fig. 1

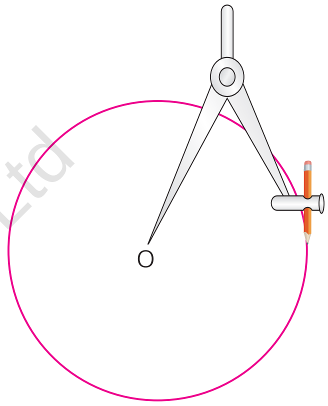


Fig. 2

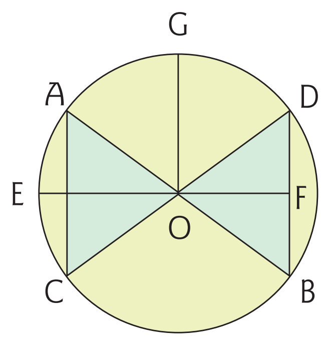
Exercise 58

1. Look at the adjoining figure. Name:

(a) all the radii shown in the circle.

(b) the diameters shown in the circle.

(c) all the chords shown in the circle.



2. Fill in the blanks.

(a) Every point on a circle is at the same distance from the ....

(b) All the radii of a circle are ....

(c) Diameter of a circle is .... its radius.

(d) A diameter is the longest .... of a circle.

(e) The length of the boundary of a circle is called its ....

3. State whether each of the following statements is true or false.

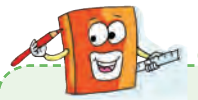
(a) A circle is a polygon. ....

(b) A circle has no vertex. ....

(c) A circle has only one diameter. ....

(d) The chord of a circle can be longer than the diameter of a circle. ....

4. A circle has a radius of 8 cm. How long is its diameter?
5. A circle has a diameter of 10 cm. How long is its radius?
6. Draw a circle of radius 4 cm, using compasses. Name its centre as O. Draw and mark:
   (a) a radius OM (b) a diameter XY (c) a chord MN
7. Draw a circle of radius 2.5 cm.



Things to Remember

1. The figures traced out with the sharp edge of a pencil without lifting the pencil are called curves.
2. Curves which start and end at the same point are known as closed figures.
3. A closed figure which does not intersect itself is called a simple closed figure.
4. A simple closed figure formed of three or more line segments is called a polygon.
5.

Number of sides	Name of the polygon
3	Triangle
4	Quadrilateral
5	Pentagon
6	Hexagon

6. The line segments joining the opposite vertices of a quadrilateral are called its diagonals.
7. A rectangle is a special type of quadrilateral, in which:
   (a) opposite sides are equal. (b) diagonals are equal.
8. A square is a special type of rectangle, in which all the four sides are equal.
9. A circle is a closed figure each of whose points is equidistant from a fixed point inside it, called the centre.
10. The distance between the centre of a circle and any point on it is called its radius.
11. A line segment that joins two points on a circle is called a chord of the circle.
12. A chord which passes through centre of the circle is called a diameter of the circle. Diameter is the longest chord of a circle.

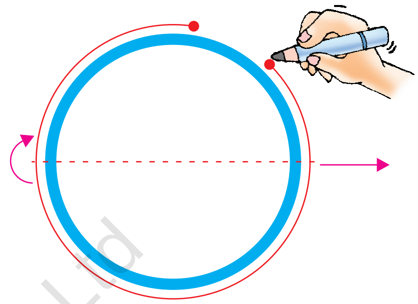
    Diameter = 2 × Radius

13. The length of the boundary of a circle is called the circumference of the circle.

Activity Time

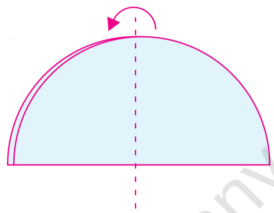
To find the centre of a circle by paper folding.

This activity is based on the fact that the diameter of a circle passes through the centre of the circle and so, two diameters of a circle will meet each other at the centre.

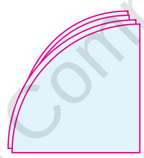


Method: Place a circular object such as a big bangle, a ring, lid of a jar etc. on paper sheet and trace its outline to form a circle as shown below. Cut out the circle.

Now, Fold the circle in half and press the fold tight to form a crease.

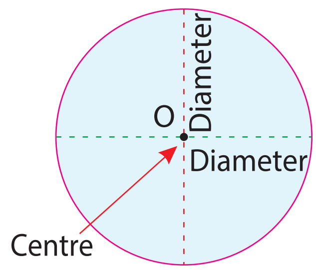


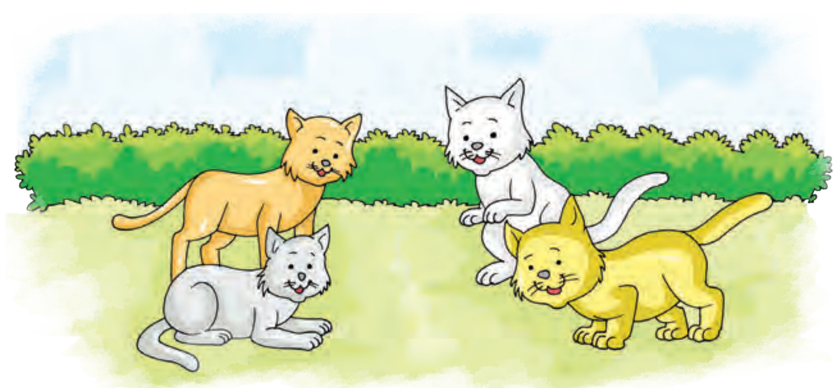
Again, fold the paper in half.



Open up the folded paper.

Two creases are seen on the paper – one horizontal and one vertical – both meeting at a point in the middle. Each crease is a diameter of the circle and their meeting point is the centre of the circle. Darken the diameters with a coloured pen and label the centre as O.





C.C.E. Drill 12

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. Which of the following represents a line?

(a) 

☐ (b) 

☐ (c) 

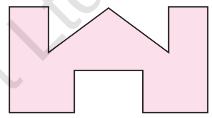
☐ (d) 

☐

2. $\overline{PQ}$ represents a

(a) ray ☐ (b) line ☐ (c) line segment ☐ (d) point ☐

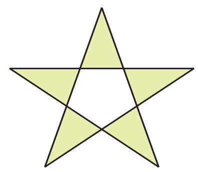
3. How many line segments are there in the adjacent figure?



(a) 10 ☐ (b) 11 ☐

(c) 12 ☐ (d) 13 ☐

4. How many different line segments are there in the adjacent figure?



(a) 5 ☐ (b) 12 ☐

(c) 15 ☐ (d) 30 ☐

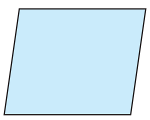
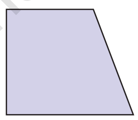
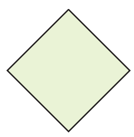
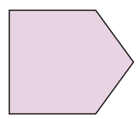
5. 8 cm 3 mm equals

(a) 8.3 mm ☐ (b) 8.3 cm ☐ (c) 8.03 cm ☐ (d) None of these ☐

6. Each side of a polygon is a

(a) ray ☐ (b) line ☐ (c) line segment ☐ (d) Both (b) and (c) ☐

7. Which of the following is not a quadrilateral?

(a)  ☐ (b)  ☐ (c)  ☐ (d)  ☐

8. In the adjoining figure, if AC = 12 cm, BD = 17 cm and AD = 24 cm. What is the distance between points B and C?

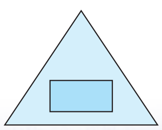
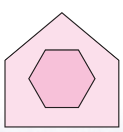
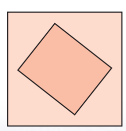
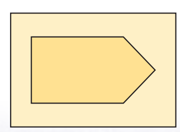
(a) 3 cm ☐ (b) 4 cm ☐ (c) 5 cm ☐ (d) 6 cm ☐

9. Which of the following is not an example of ray?

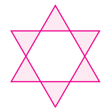
(a) Light emitted by a candle ☐ (b) Light from the sun ☐

(c) Arrow shot from a bow ☐ (d) Railway tracks ☐

10. Which of the following is different from the other three?

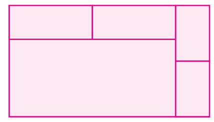
(a)  ☐ (b)  ☐ (c)  ☐ (d)  ☐

11. The number of triangles in the given figure is



(a) 6 (b) 8 (c) 10 (d) 12

12. The number of rectangles in the given figure is

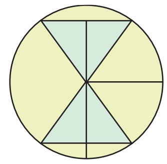


(a) 6 (b) 7 (c) 8 (d) 9

13. A .... is a line segment whose end points lie on the circle.

(a) radius (b) chord (c) arc (d) diagonal

14. How many radii can you count in the adjacent circle?



(a) 2 (b) 4 (c) 6 (d) 8

15. How many chords can you count in the given circle?

(a) 2 (b) 3 (c) 4 (d) 5

QUESTION BAG 2

1. Fill in the blanks.

(a) A polygon can have minimum .... sides.
(b) A polygon with .... sides is called a heptagon.
(c) A .... has a fixed length.
(d) A .... has no end-point.
(e) There are .... millimetres in a centimetre.
(f) A part of a line is called a ....
(g) A part of a circle is called a/an ....
(h) A .... has 5 sides and 5 vertices.
(i) The .... is a chord that splits a circle into two halves.
(j) A .... figure starts and ends at the same point.
(k) The number of rays that can be drawn taking P as the end point is ....
(l) A circle has no .... and no ....
(m) When we draw a circle using a compass, then the distance between the tip of the needle and that of the pencil gives the .... of the circle.

2. How many lines can be drawn to pass through

(a) a point (b) two given points

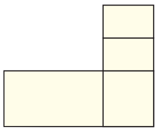


Fig. 1

3. How many rectangles are there in the Fig.1?

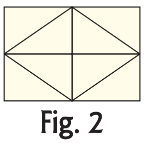


Fig. 2

4. How many line segments are there in the Fig.2?

5. State whether each of the following statements is true or false.

(a) All squares are quadrilaterals. ....
(b) A triangle is a polygon. ....
(c) The diagonals of a rectangle are always equal. ....
(d) A line segment joining the centre of a circle to a point on it is called a chord. ....
(e) The chord of a circle can be shorter than the radius of a circle. ....

15 Perimeter of Rectilinear Figures

Rectilinear Figure

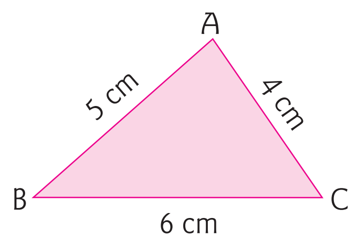
A plane figure bounded by line segments is called a rectilinear figure.

Thus each one of the figures – a triangle, a quadrilateral, a hexagon is a rectilinear figure. A circle is not a rectilinear figure.

Perimeter of a Rectilinear Figure

The sum of all sides of a rectilinear figure is called its perimeter.

Example 1: Find the perimeter of a triangle ABC in which AB = 5 cm, BC = 6 cm and CA = 4 cm.



Solution: Perimeter of Δ ABC = AB + BC + CA

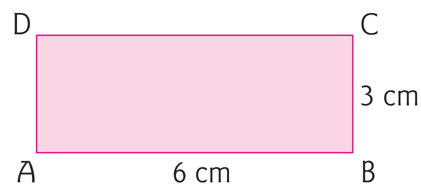
= 5 cm + 6 cm + 4 cm

= 15 cm.

Hence, the perimeter of Δ ABC is 15 cm.

Example 2: Find the perimeter of a rectangle ABCD in which AB = 6 cm and BC = 3 cm.

Solution: We know that the opposite sides of a rectangle are equal.



Therefore, CD = AB = 6 cm.

And, AD = BC = 3 cm.

$\therefore$ Perimeter of rectangle ABCD = AB + BC + CD + AD

= 6 cm + 3 cm + 6 cm + 3 cm

= 18 cm.

Hence, the perimeter of rectangle ABCD is 18 cm.

Note that: Perimeter of rectangle ABCD = AB + BC + CD + AD

= AB + BC + AB + BC [Since CD = AB, AD = BC]

= 2AB + 2BC

= 2 × (AB + BC)

= 2 × (Length + Breadth)

Hence, **Perimeter of a rectangle = 2 × (Length + Breadth)**

Example 3: **Find the perimeter of a rectangular field whose length is 64 metres and breadth 53 metres.**

Solution: Perimeter $= 2 \times (\text{Length} + \text{Breadth})$

$= 2 \times (64 \text{ m} + 53 \text{ m})$

$= (2 \times 117) \text{ m} = 234 \text{ m}.$

Hence, the perimeter of the field is 234 metres.

Example 4: **The perimeter of a rectangular park is 180 metres. If its length is 57 metres, find its breadth.**

Solution: Length + Breadth $= \frac{1}{2} \times \text{Perimeter}$

$= \frac{1}{2} \times 180 \text{ m} = 90 \text{ m}.$

$\therefore$ Breadth $= 90 \text{ m} - 57 \text{ m} = 33 \text{ m}.$ [$\because$ Length = 57 m (given)]

Example 5: **Find the perimeter of a square each of whose sides is 8 cm.**

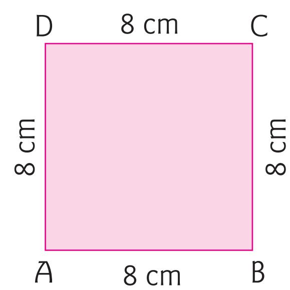
Solution: Let ABCD be a square in which

AB = BC = CD = DA = 8 cm.

$\therefore$ Perimeter of the square ABCD = AB + BC + CD + DA

= 8 cm + 8 cm + 8 cm + 8 cm

= 32 cm.



Hence, the perimeter of the given square is 32 cm.

Note that: Perimeter of square ABCD = AB + BC + CD + DA

= AB + AB + AB + AB [$\because$ BC = CD = DA = AB]

$= 4 \times \text{AB}$

$= 4 \times$ Side of the square

$\therefore$ **Perimeter of a square = 4 × Side of the square**

Example 6: **The length of a square field is 72 metres. What length of wire will be needed for fencing all around the field?**

Solution: Side of the square field = 72 m.

Perimeter of the field $= 4 \times \text{side}$

$= (4 \times 72) \text{ m}$

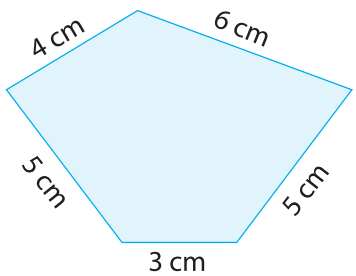
$= 288 \text{ m}.$

$\therefore$ The length of wire needed for fencing all around the field = 288 m.

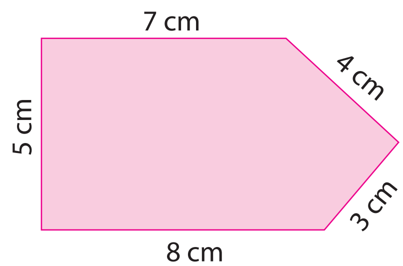
Exercise 59

1. **Find the perimeter of each of the following figures.**

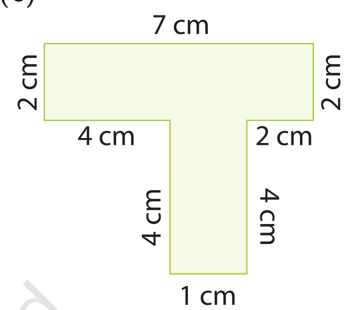
(a)



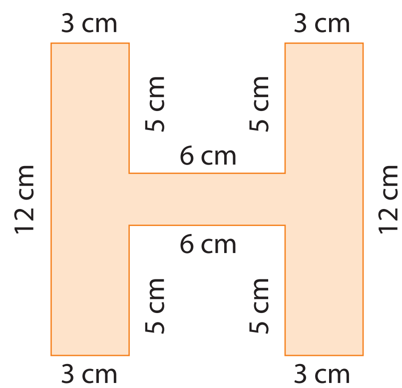
(b)



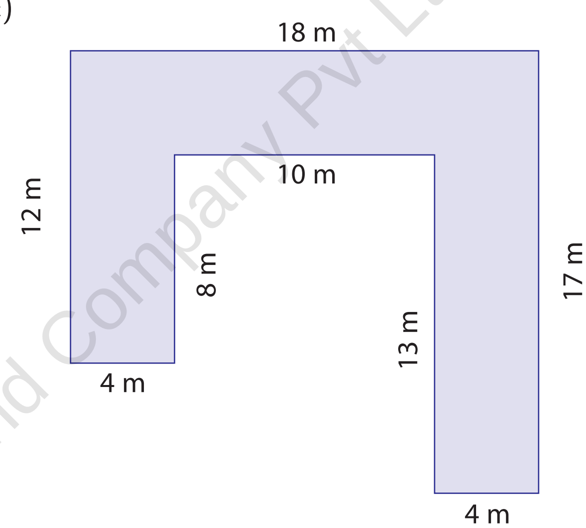
(c)



(d)



(e)



2. **Find the perimeter of the triangle whose sides are:**
   (a) 16 cm, 18 cm and 24 cm
   (b) 31 cm, 45 cm and 68 cm
   (c) 12 m, 19 m and 28 m
   (d) 6 m 54 cm, 4 m 42 cm and 8 m 44 cm
3. Find the perimeter of a triangle two of whose sides are each 25 cm long and the third side is 36 cm long.
4. Find the perimeter of a triangle each of whose sides is 14 cm long.
5. **Find the perimeter of the rectangle whose:**
   (a) length = 36 cm, breadth = 24 cm
   (b) length = 17 cm, breadth = 6 cm
   (c) length = 28 cm, breadth = 19 cm
   (d) length = 18 m 65 cm, breadth = 12 m 15 cm

6. **Find the perimeter of the square each of whose sides is:**

(a) 16 cm (b) 21 cm (c) 28 m (d) 11 m 25 cm

7. The side of a square lawn is 24 metres. Find the length of the fence around it.
8. The length and breadth of a rectangular park are 96 metres and 74 metres respectively. A boy runs 2 times around the park. Find the distance covered by him.
9. The length and breadth of a rectangular garden are 125 metres and 95 metres respectively. Find the length of the wire needed to fence all around the garden four times.
10. Find the cost of fencing a square park of side 150 m at the rate of ₹ 6 per metre.
11. The perimeter of a square field is 72 metres. Find the length of the side of the square.
12. The perimeter of a rectangular field is 164 metres. If its length is 50 metres, find its breadth.
13. The perimeter of a rectangular field is 120 metres. If its breadth is 27 metres, find its length.

Things to Remember

1. A plane figure bounded by line segments is called a rectilinear figure.
2. The sum of all the sides of a rectilinear figure is called its perimeter.
3. Perimeter of a rectangle = 2 × (Length + Breadth)
4. Perimeter of a square = 4 × Side of the square
5. Side of a square = Perimeter of the square ÷ 4
6. Length of a rectangle = $\left(\frac{1}{2} \times \text{its Perimeter}\right) - (\text{its Breadth})$
7. Breadth of a rectangle = $\left(\frac{1}{2} \times \text{its Perimeter}\right) - (\text{its Length})$

C.C.E. Drill 13

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. A playground which is 250 m long and 20 m broad is to be fenced with wire. What length of wire is needed?

(a) 230 m ☐ (b) 270 m ☐ (c) 440 m ☐ (d) 540 m ☐

2. The perimeter of a square is 144 m. Then the side of the square is

(a) 34 m ◯ (b) 36 m ◯ (c) 38 m ◯ (d) 44 m ◯

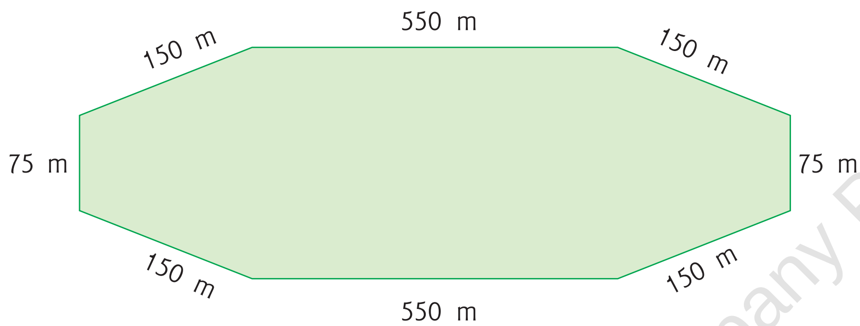
3. What length of wood is required to frame a picture 80 cm by 35 cm?

(a) 1 m 15 cm ◯ (b) 1 m 30 cm ◯ (c) 2 m 15 cm ◯ (d) 2 m 30 cm ◯

4. If the perimeter of a triangle is 39 m and its two sides are 12 m and 14 m, then the measure of the third side is

(a) 13 m ◯ (b) 15 m ◯ (c) 16 m ◯ (d) 23 m ◯

5. The perimeter of the given figure is



(a) 1 km 85 m ◯ (b) 1 km 95 m ◯

(c) 1 km 850 m ◯ (d) 1 km 950 m ◯

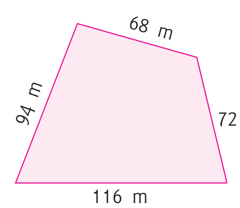
6. If a hexagon of perimeter 24 cm has equal side lengths, then the length of its side is

(a) 3 cm ◯ (b) 4 cm ◯ (c) 6 cm ◯ (d) 8 cm ◯

7. Manick is preparing for an athletic championship. Everyday he runs 8 rounds of a square field with each side measuring 350 m. How much distance does he run everyday?

(a) 11 km 800 m ◯ (b) 12 km 400 m ◯ (c) 12 km 80 m ◯ (d) 11 km 200 m ◯

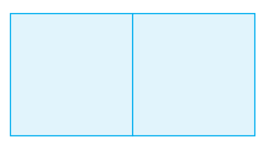
8. Raj walks around the park shown here everyday. How far does he walk in 5 rounds of the park?



(a) 1 km 650 m ◯ (b) 1 km 680 m ◯

(c) 1 km 740 m ◯ (d) 1 km 750 m ◯

9. A figure is formed by joining two squares as shown. If the length of each side of the two squares is 8 cm, then the perimeter of the figure so formed is



(a) 32 cm ◯ (b) 48 cm ◯

(c) 56 cm ◯ (d) 64 cm ◯

QUESTION BAG 2

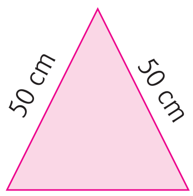
1. Calculate the missing measurements of each of the following squares and rectangles.

	Perimeter of a square	Length of a side
(a)	180 cm	
(b)		65 m
(c)	452 m	

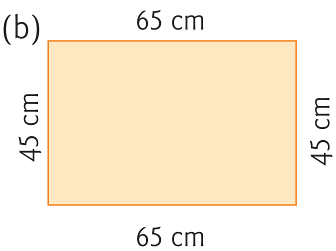
	Perimeter of a rectangle	Length	Breadth
(d)	180 cm		60 m
(e)	62 cm	18 cm	
(f)	356 m		55 m

2. Find the perimeter and express it in m and cm.

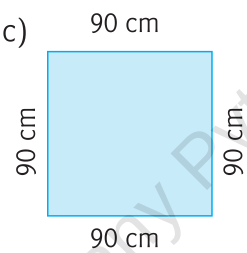
(a)



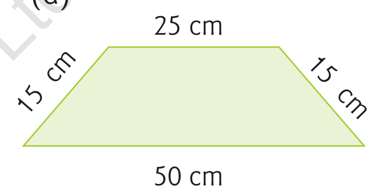
(b)



(c)

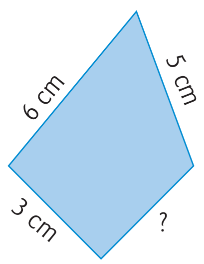


(d)



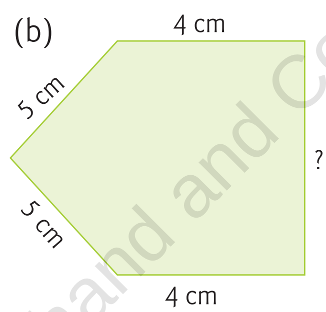
3. Find the missing length.

(a)



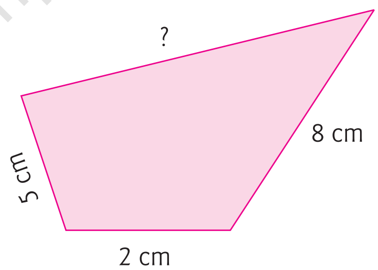
Perimeter = 18 cm

(b)



Perimeter = 24 cm

(c)



Perimeter = 26 cm

4. A triangular park has each side of length 425 m. Find its perimeter and express it in km and m.

16 Three-Dimensional Shapes

Solids

An object that has a fixed shape and size is called a solid.

A solid occupies a fixed amount of space.

Thus, everyday objects like a football, a box, a bicycle, etc. are all solids.

Solids occur in different shapes. These shapes are known as 3-dimensional shapes.

Practically, we define a 3-dimensional figure as the one that has height (or depth) in addition to width and length.

The various types of 3-dimensional shapes are cuboid, cube, cylinder, cone, sphere, prism and pyramid.

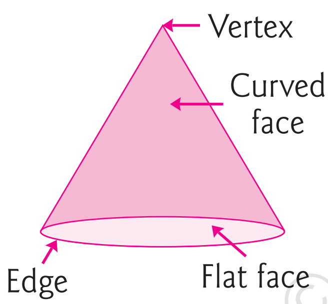
Faces, Edges and Vertices

The flat surfaces of 3-dimensional figures are called faces.

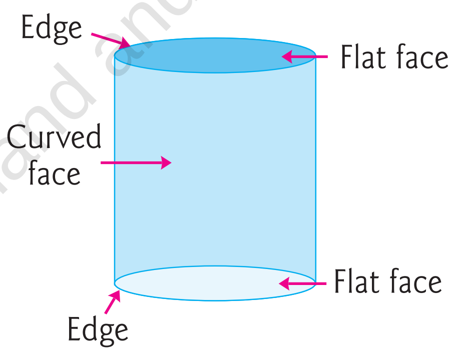
Two faces of a 3-dimensional figure meet in a line segment called an edge.

Two or more edges meet in a point called vertex.

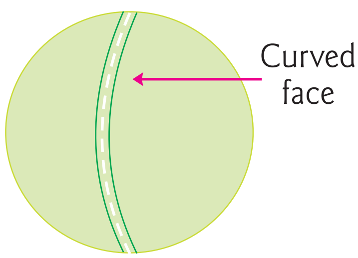
We have studied the faces, edges and vertices of cone, cylinder and sphere in Class 3. Let us review the same.



Cone



Cylinder



Sphere

1. A cone has 2 faces (1 flat, 1 curved), 1 edge and 1 vertex.
2. A cylinder has 3 faces (2 flat, 1 curved), 2 edges and no vertex.
3. A sphere has 1 curved face, no edge and no vertex.

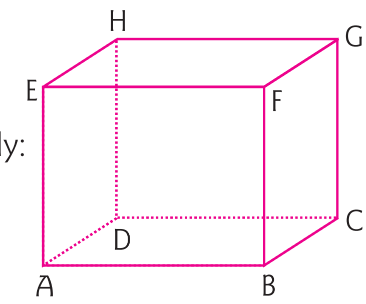
Now, we shall discuss in detail the various aspects of a cuboid, a cube and a pyramid.

Cuboid

A solid bounded by six rectangular plane faces is called a cuboid.

Solids such as a wooden box, a match box, a brick, a book, a room, an almirah etc. are all in the shape of a cuboid.

The figure of a cuboid is shown alongside.



The various parts of a cuboid are as under:

1. **Faces:** A cuboid has 6 rectangular faces or 3 pairs of opposite faces, namely:
   (i) the bottom face ABCD and the top face EFGH.
   (ii) the front face ABFE and the back face DCGH.
   (iii) the two side faces ADHE and BCGF.

2. **Edges:** Two adjacent faces of a cuboid meet in a line segment, called an edge of the cuboid. Thus, a cuboid, as shown above, has 12 edges namely, AB, BC, DC, AD, AE, DH, BF, CG, EF, FG, EH and HG.

   You shall notice that the opposite edges of a cuboid being the opposite sides of a rectangular face are equal.

   Thus, AB = DC = HG = EF.

   AD = BC = FG = EH.

   AE = BF = CG = DH.

   So, a cuboid has only three distinct dimensions known as length, breadth and height.

   In the above cuboid, we have: length = AB, breadth = BC and height = BF.

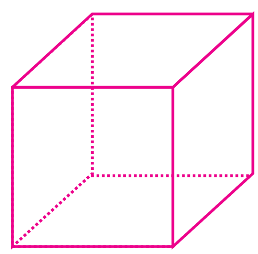
3. **Vertices:** Three edges of a cuboid meet at a point, called a vertex.

   The plural of vertex is vertices.

   Thus, a cuboid, as shown above, has 8 vertices namely A, B, C, D, E, F, G and H.

   Hence, a cuboid has 6 rectangular faces, 12 edges and 8 vertices.

Cube



A cuboid in which length, breadth and height are equal, is called a cube.

The figure of a cube is shown alongside.

Each side of a cube is called its edge.

Thus, all the edges of a cube are equal.

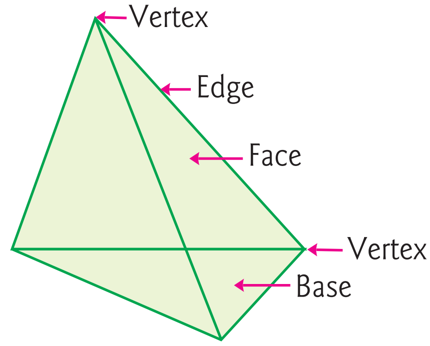
Ice cubes, sugar cubes, dice etc. are all examples of a cube. Clearly, a cube has 6 square faces, 12 edges and 8 vertices.

Pyramid

A pyramid is a solid whose base is a plane rectilinear figure and whose side faces are triangles having a common vertex, called the vertex of the pyramid.

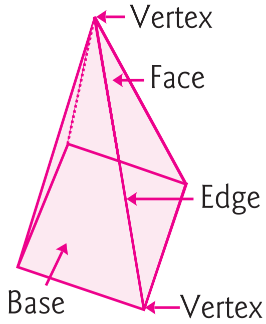
If the base of a pyramid is a triangle, it is called a triangular pyramid.

Thus, all the faces of a triangular pyramid, including its base, are triangles.
A triangular pyramid has 4 faces, 6 edges and 4 vertices.



Triangular Pyramid

If the base of a pyramid is a square, it is called a square pyramid.
A square pyramid has 5 faces – one square and four triangular.
It has 8 edges and 5 vertices.



Square Pyramid

Activity Time

Nets of 3-dimensional Figures

A net of a 3-dimensional figure is the shape that can be cut out of a plane piece of paper or cardboard and folded to make the 3-dimensional shape.

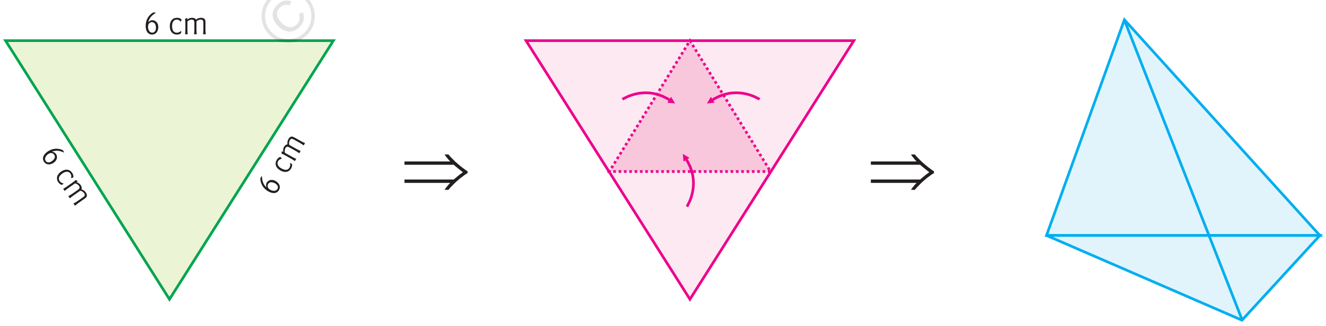
The activity involving formation of 3-dimensional figures from nets shall help you understand and remember these shapes better.

Activity 1: Forming a net of a 4-faced triangular pyramid

Take a plane sheet of paper and draw a triangle of each side 6 cm as shown below. Cut out this triangle. Now, mark the mid-point of each side of this triangle and join these points as shown.

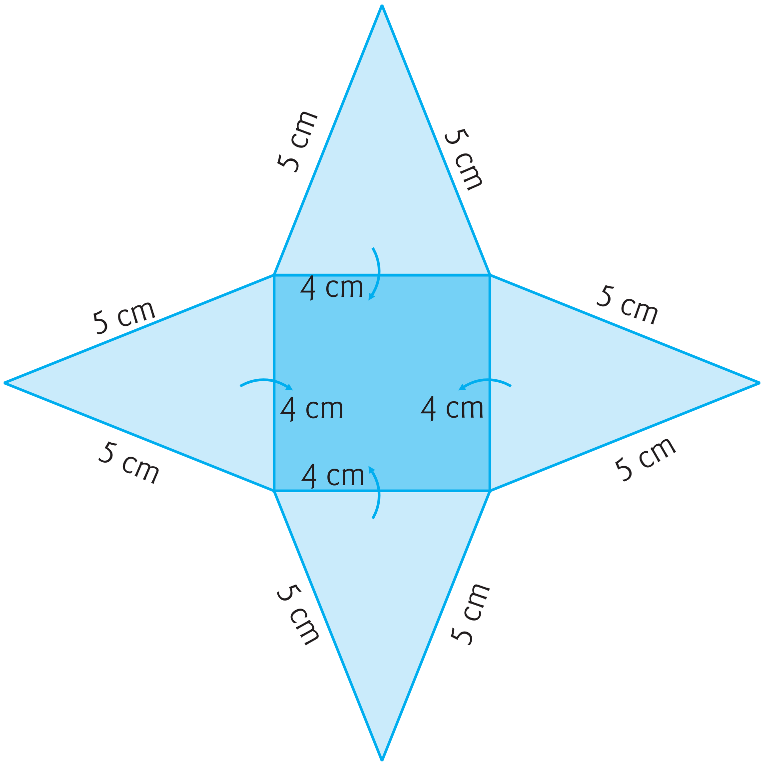
Fold the three triangles so formed along the dotted lines upwards so that their upper vertices meet at a point to form the vertex of the pyramid.

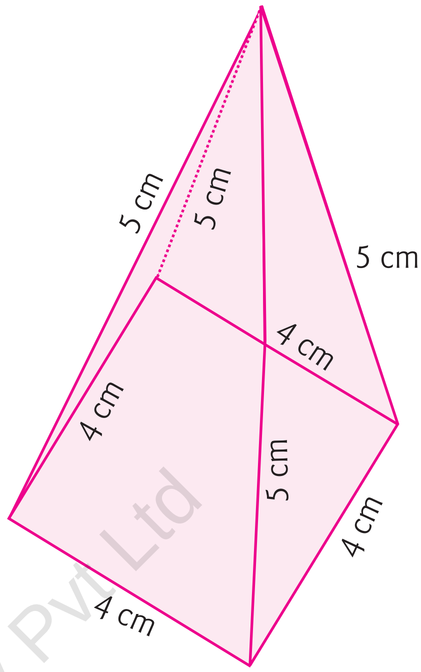
The figure so obtained is a triangular pyramid.



Activity 2: Forming a net of a 5-faced square pyramid

Take a plane sheet of paper and draw a square of each side 4 cm. On each side of this square, draw a triangle with each of the remaining two sides equal to 5 cm, as shown.





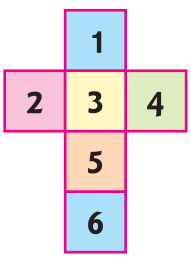
Cut out this figure. Now, fold the four triangles upwards along the sides of the square so that their upper vertices meet at a point to form the vertex of the pyramid.

Activity 3: Forming 6-faced figures from nets

In this activity, we shall learn to form cubes and cuboids from nets. You shall observe here that the nets for formation of cubes have a continuous arrangement of six squares. (Note that not all arrangements of six squares can form a net for a cube). The idea of formation of cubes from nets may be extended to cuboids wherein each net has an arrangement of six rectangles.

Formation of Cubes: Each of the following nets forms a cube when folded. Here, the six squares in each net have been marked with numbers from 1 to 6.

1.

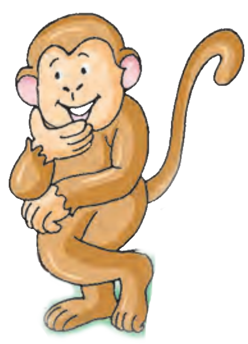


When folded, this net forms a cube in which:

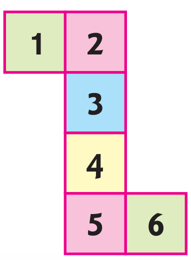
(i) 1 lies opposite 5.

(ii) 2 lies opposite 4.

(iii) 3 lies opposite 6.



2.



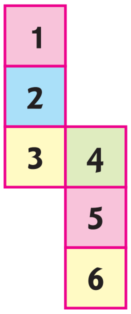
When folded, this net forms a cube in which:

(i) 1 lies opposite 6.

(ii) 2 lies opposite 4.

(iii) 3 lies opposite 5.

3.



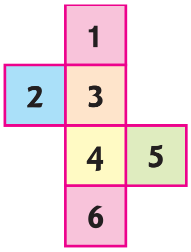
When folded, this net forms a cube in which:

(i) 1 lies opposite 3.

(ii) 2 lies opposite 5.

(iii) 4 lies opposite 6.

4.



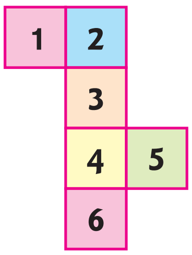
When folded, this net forms a cube in which:

(i) 1 lies opposite 4.

(ii) 2 lies opposite 5.

(iii) 3 lies opposite 6.

5.



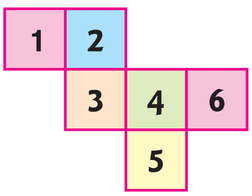
When folded, this net forms a cube in which:

(i) 1 lies opposite 5.

(ii) 2 lies opposite 4.

(iii) 3 lies opposite 6.

6.



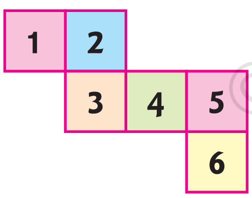
When folded, this net forms a cube in which:

(i) 1 lies opposite 4.

(ii) 2 lies opposite 5.

(iii) 3 lies opposite 6.

7.



When folded, this net forms a cube in which:

(i) 1 lies opposite 4.

(ii) 2 lies opposite 6.

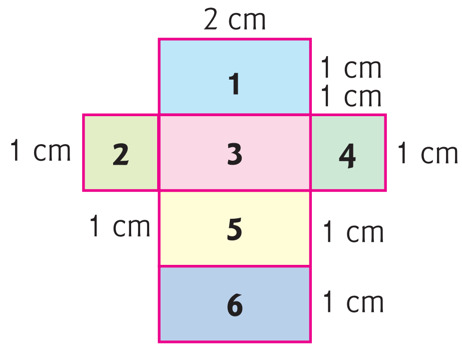
(iii) 3 lies opposite 5.

Remarks for the Teachers

The teachers are advised to make cutouts of these nets and explain to the students how these nets can be folded to form cubes and also which numbers would lie on the face opposite to a particular number.

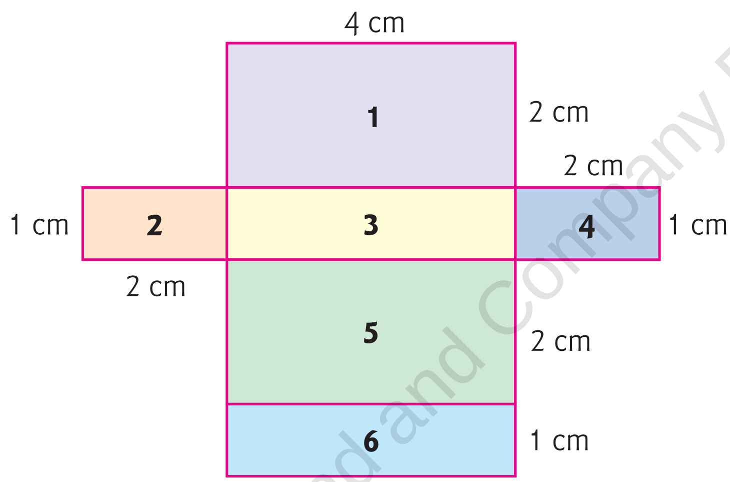
Formation of Cuboids: Any of the nets specified above for the formation of cubes may be converted to a net for a cuboid by replacing some (or all) of the squares to rectangles.

Consider the following net:

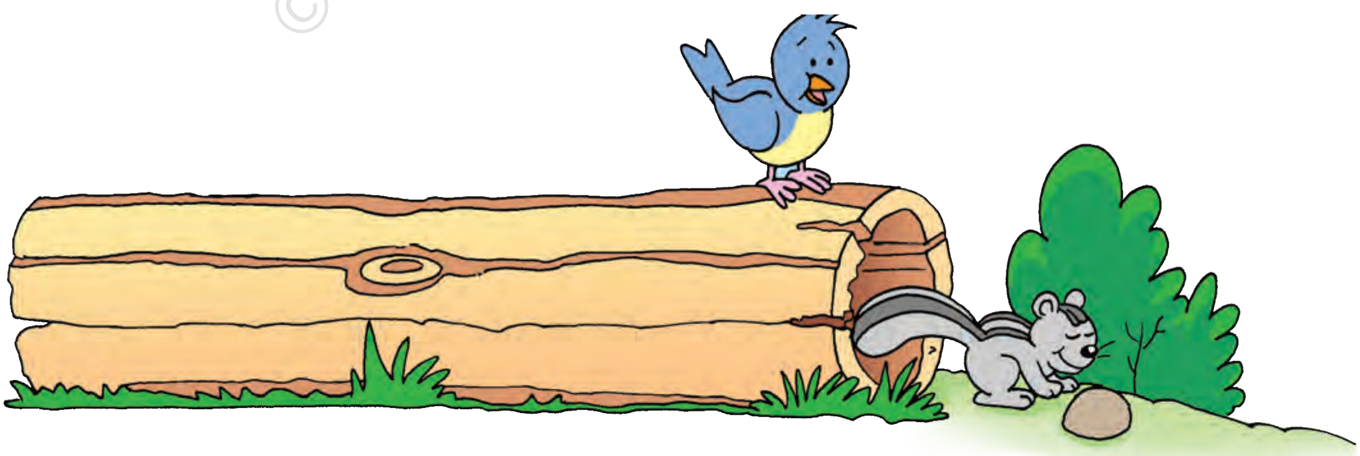


Clearly, this net is similar to form 1 discussed for the cubes wherein the squares marked 1, 3, 5 and 6 have been converted to rectangles. This net when folded, will form a cuboid having dimensions 2 cm × 1 cm × 1 cm. Also, the face marked 1 lies opposite 5; the face marked 2 lies opposite 4 and the face marked 3 lies opposite 6.

Consider the following net:



Clearly, this net is again similar to form 1 discussed for the cubes wherein all the squares have been converted to rectangles. This net when folded will form a cuboid having dimensions 4 cm × 2 cm × 1 cm. Also, the face marked 1 lies opposite 5; the face marked 2 lies opposite 4 and the face marked 3 lies opposite 6.

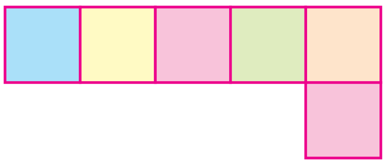


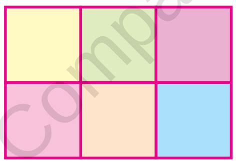
Exercise 60

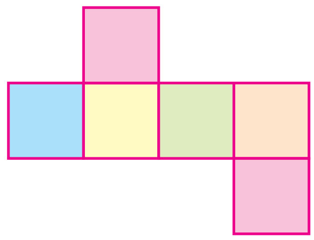
1. Complete the following table.

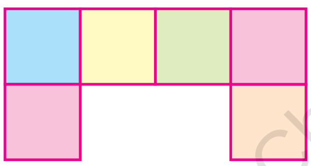
	Solid	Faces	Edges	Vertices
(a)	Cuboid			
(b)	Cube			
(c)	Cone			
(d)	Cylinder			
(e)	Sphere			
(f)	Triangular Pyramid			
(g)	Square Pyramid			

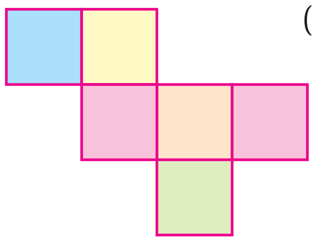
2. Which of the following nets can be used to form a cube?

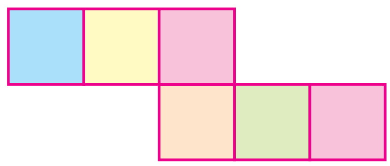
(a) 

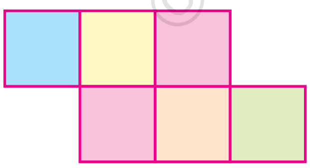
(b) 

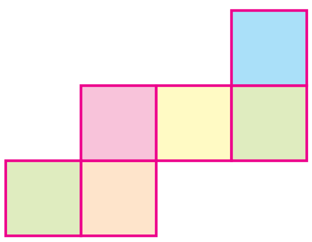
(c) 

(d) 

(e) 

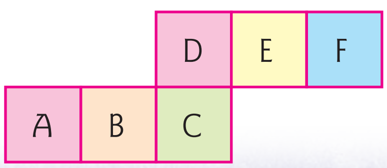
(f) 

(g) 

(h) 

3. Form a net for a cuboid having dimensions 2 cm × 3 cm × 5 cm.

4. The following net is folded to form a cube. Which letter will lie opposite the letter E?



C.C.E. Drill 14

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. How many edges does a square pyramid have?

(a) 4 (b) 5 (c) 7 (d) 8

2. Which of the following solids has just one vertex?

(a) Cone (b) Sphere

(c) Cylinder (d) Triangular Pyramid

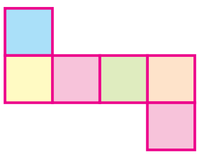
3. Which of the following solid shapes has the maximum number of edges?

(a) Square pyramid (b) Cylinder

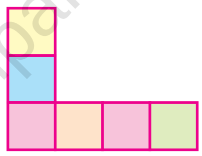
(c) Triangular pyramid (d) Cuboid

4. Which of the following nets will not form a cube when folded?

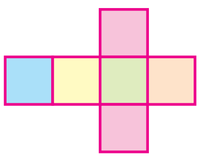
(a)



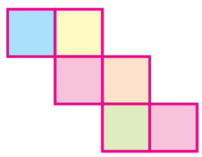
(b)



(c)

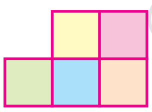


(d)

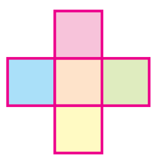


5. Which of the following nets cannot be used to form a cubical box with no lid?

(a)



(b)



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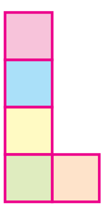
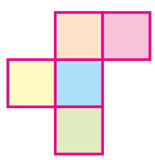


(d)



QUESTION BAG 2

1. Name a solid with

(a) only one curved face ....

(b) only one flat face ....

(c) no vertex ....

(d) no edge ....

(e) 5 vertices ....

(f) 2 circular edges ....

(g) 4 triangular faces ....

2. Answer the following questions.

(a) How many edges of a cuboid meet in a vertex? $\boxed{}$

(b) How many faces of a solid meet in an edge? $\boxed{}$

(c) How many edges does a triangular pyramid have? $\boxed{}$

3. State whether each of the following statements is true or false.

(a) A cube has 6 square faces. ....

(b) A cuboid can have one or more square faces. ....

(c) A cylinder has 2 straight edges. ....

(d) A sphere has one circular edge. ....

(e) A triangular pyramid has 3 vertices. ....

(f) A cuboid has 3 pairs of identical faces. ....

4. Fill in the blanks.

(a) A cuboid has 6 .... faces.

(b) A cube has 12 .... edges.

(c) A cone has one .... edge.

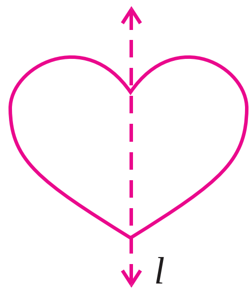
(d) A cylinder has 2 .... faces and 1............................ face.

17 Symmetry

Introduction

We see various objects and figures in our daily life. Some of these figures and objects are symmetrical and some are asymmetrical.

Look at the figure shown alongside.



Observe that the two parts on both sides of the dotted line are exactly identical, i.e., if you fold the figure along the dotted line, the two parts exactly overlap each other. Such figures are said to be symmetrical and the dotted line is called the line or axis of symmetry.

Thus, if a figure is identical on either side of a line l, it is said to be symmetrical about the line l, and the line l is known as the line of symmetry.

The figures which do not possess this property are said to be asymmetrical. Thus, asymmetrical figures are those that cannot be folded into two equal halves i.e., which do not have a line of symmetry.

Activity

Folding Activity

Fold a piece of paper into two halves [Fig (a)].

Draw a shape and cut it out. [Fig. (b)].

Unfold the paper [Fig. (c)].

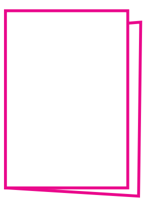


Fig. (a)

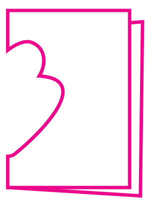


Fig. (b)

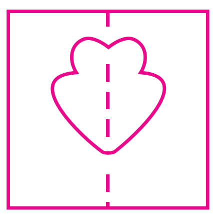
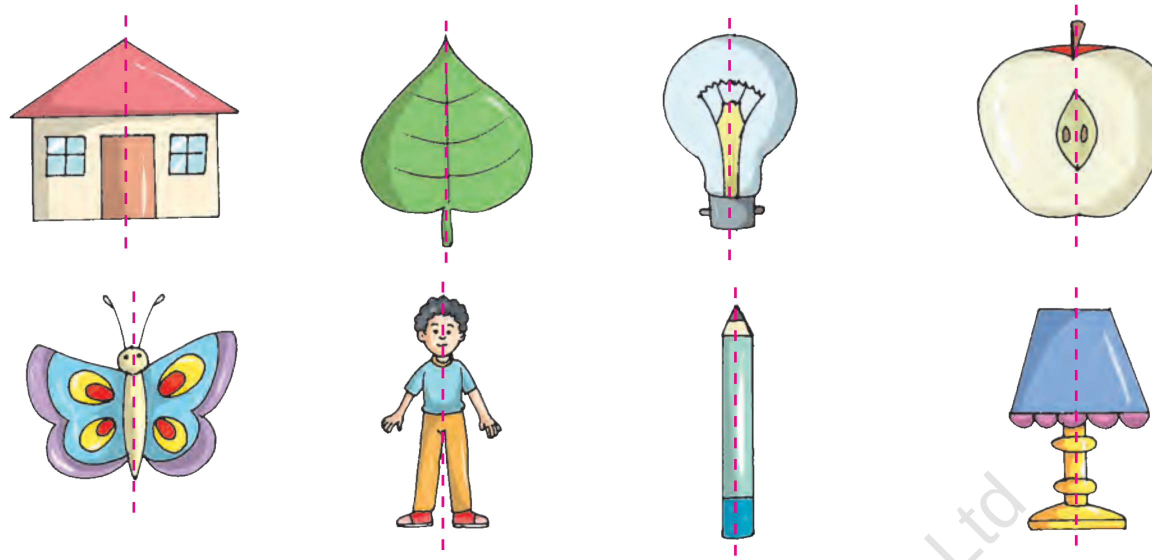


Fig. (c)

The shape in Fig. (c) is symmetrical about the crease of the fold since both halves are exactly the same. The crease in the middle of the paper is called the line of symmetry of this figure.

Some examples of symmetry from objects around us are given below:



Below are shown some English letters, with their lines of symmetry:

A B C D E H I K

M O T U V W X Y

You may very well see that the letters H, I, O and X are symmetrical about a horizontal, as well as a vertical dotted line as shown above.

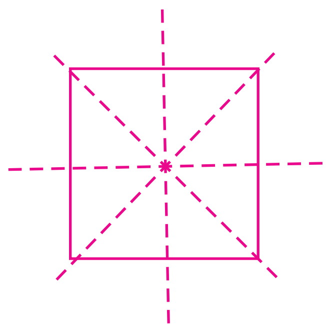
They are, thus, said to have two lines of symmetry.

On the other hand, the letters F, G, J, L, N, P, Q, R, S and Z are asymmetrical.

Symmetry in Geometrical Shapes

1. Square: Look at the square shown in the adjoining figure.

Here, the two parts of the square on both sides of each of the dotted lines are equal and identical. So,



A square has 4 lines of symmetry — the two diagonals, and the lines joining the mid-points of pairs of opposite sides.

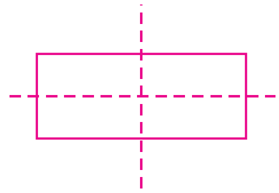
The above idea can be very well explained by an activity.

Activity

Take a square piece of paper and fold it along one of the diagonals. The two parts coincide and overlap each other exactly. Now, repeat the same activity along the other diagonal.

Then, take another square piece of paper, and fold it in the middle. Again the two parts overlap. Open it up and try folding it vertically along the middle line. What do you observe?

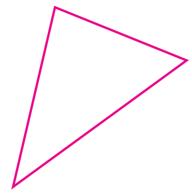
2. Rectangle: The above activity may be repeated using a rectangular piece of paper. We find that



A rectangle has 2 lines of symmetry; namely the lines joining the mid-points of pairs of opposite sides.

3. Triangle: (a) **Triangle with all sides unequal**

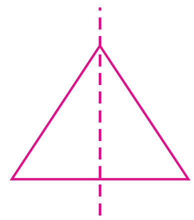
Take a triangular sheet with all three sides of different lengths. Fold it in different ways. Its two parts do not coincide in any case. Thus,



A triangle with all sides of different lengths is not symmetrical about any line.

(b) **Triangle with two sides equal**

Take a triangular sheet with two sides equal and the base of a different length. Fold it from left to right along the middle line as shown.

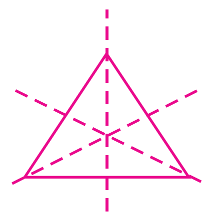


We observe that the two parts overlap each other exactly. Thus,

A triangle with two sides equal, is symmetrical about the line joining the common vertex of two equal sides to the mid-point of the opposite side.

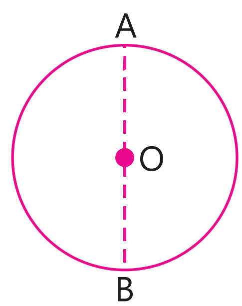
(c) **Triangle with all sides equal**

Take a triangular sheet with all sides equal and try folding it along three different lines as shown here. What do you observe? Thus,



A triangle with all sides equal has three lines of symmetry — the lines joining the vertices to the mid-points of the opposite sides.

4. Circle: Draw a circle with centre O on a piece of paper. Draw a diameter AB. Cut out the circle and fold it along AB. We observe that the two parts of the circle coincide. So,



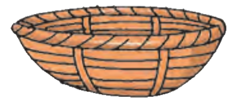
A circle is symmetrical about its diameter. Since a countless number of diameters can be drawn inside a circle, so a circle has countless lines of symmetry.

Exercise 61

1. Which of the following objects are symmetrical?

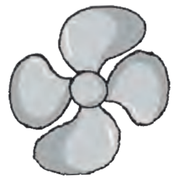
(a) 

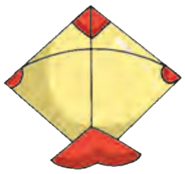
(b) 

(c) 

(d) 

(e) 

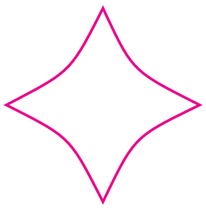
(f) 

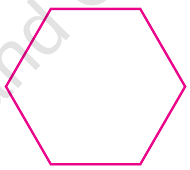
(g) 

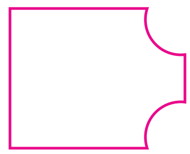
(h) 

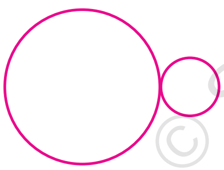
(i) 

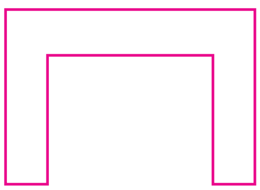
2. Draw all possible lines of symmetry of each of the following figures.

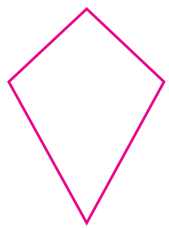
(a) 

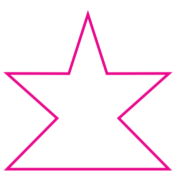
(b) 

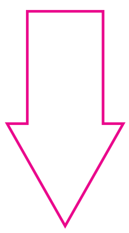
(c) 

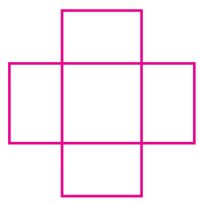
(d) 

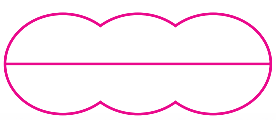
(e) 

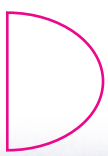
(f) 

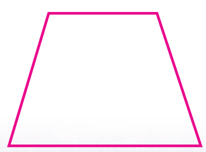
(g) 

(h) 

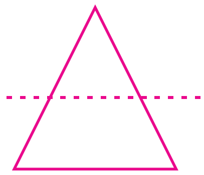
(i) 

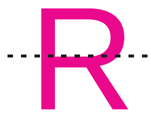
(j) 

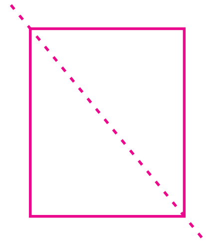
(k) 

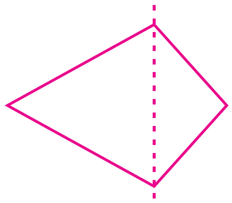
(l) 

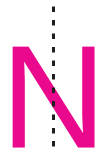
3. Is the dotted line shown in each figure, a line of symmetry?

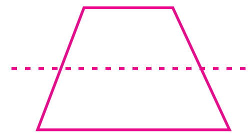
(a) 

(b) 

(c) 

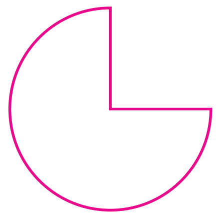
(d) 

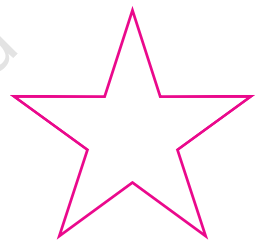
(e) 

(f) 

4. How many lines of symmetry do each of the following have?

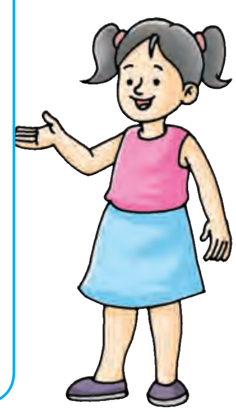
(a) 

(b) 

(c) 

5. Circle the letters and numbers which have one line of symmetry, tick (✓) the ones which have two lines of symmetry and cross (x) those which are asymmetrical.

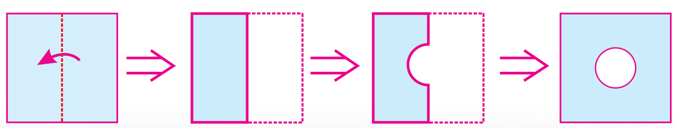
A	B	C	D	E	F	G	H
I	J	K	L	M	N	O	P
Q	R	S	T	U	V	W	X
Y	Z	1	2	3	4	5	6
7	8	9					



Activity Time

Paper Folding and Cutting

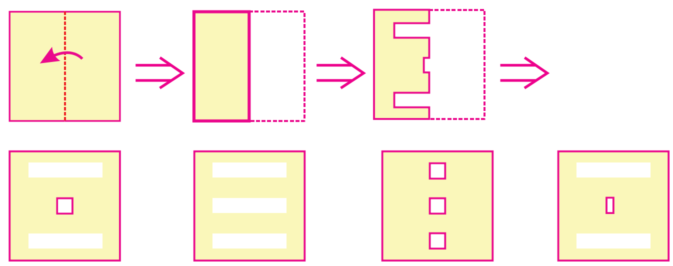
Take a plane square sheet of paper. Fold it along the middle. Now, using a pair of scissors, cut out a semicircle as shown. Open up the folded paper. What do you observe?



You will observe that the cut out shape resembles a complete circle upon opening the folded sheet. The fold or crease created in the paper passes exactly through the middle of the circle and divides it into two identical halves.

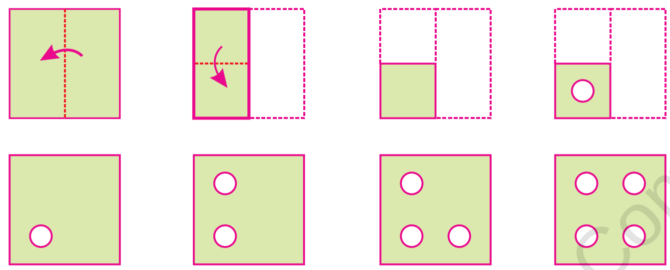
Observe the following cases of paper folding and cutting and choose the correct pattern which you shall obtain on unfolding the paper from the given possible patterns (a), (b), (c) and (d).

1.



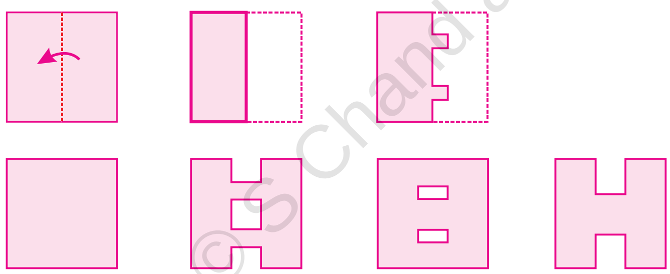
(a) (b) (c) (d)

2.



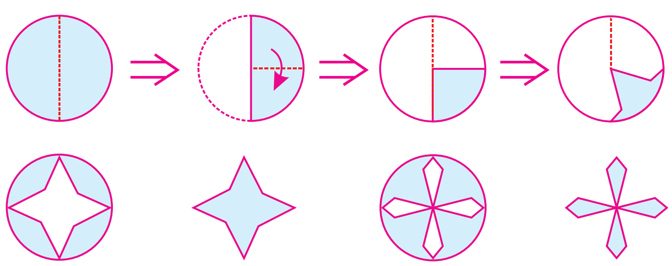
(a) (b) (c) (d)

3.



(a) (b) (c) (d)

4.



(a) (b) (c) (d)

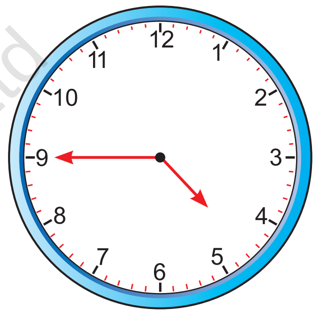
18 Time

Measurement of time is an important aspect in our daily life. It helps us to prepare our schedule and work in an orderly manner.

In our everyday life, we read the time from a watch or a clock.

Facts About a Clock

Look at the face or dial of the given clock.



1. Divisions on the Dial of the Clock

The face or dial of the clock is divided into 12 equal big divisions, labelled as 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12.

The space between every pair of two consecutive numbers is divided into 5 equal small divisions.

Thus, the dial is divided into $(12 \times 5) = 60$ small divisions.

2. Hands of the Clock

The clock has two hands – a longer hand and a shorter hand.

The longer hand is called minute hand.

The shorter hand is called hour hand.

3. Movements of the Minute Hand

The minute hand moves from one small division to the next small division in 1 minute. The minute hand goes once round the dial in 1 hour.

Thus, the minute hand covers 60 small divisions in 1 hour.

∴ **1 hour = 60 minutes**

The minute hand moves from one number to the next number in 5 minutes.

4. Movements of the Hour Hand

The hour hand moves from one number to the next number in 1 hour.

The hour hand takes 12 hours to complete one round.

Also, it takes 2 full rounds of the clock in a day.

∴ **1 day = 24 hours**

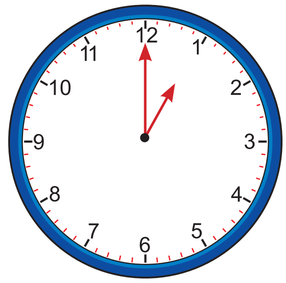
Reading Time

By looking at the positions of the two hands of the clock, we can tell the time.

Read the following examples to learn how to read time from a clock.

Solved Examples

Example 1: Look at the figure of the clock. What time does it show?



Solution: In this figure, the hour hand is at 1 and the minute hand is at 12.

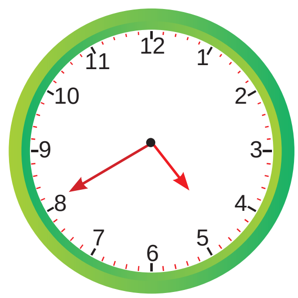
∴ The time is 1 o'clock.

Similarly, when the hour hand is at 2 and the minute hand is at 12, the time is 2 o'clock and so on.

Thus, we have:

Hour hand	Minute hand	Time
at 3	at 12	3 o'clock
at 6	at 12	6 o'clock
at 9	at 12	9 o'clock
at 10	at 12	10 o'clock

Example 2: Look at the figure of the clock. What time does it show?



Solution: In this figure, the hour hand is between 4 and 5.

So, the time is between 4 o'clock and 5 o'clock.

The minute hand is at 8.

So, the minute hand has moved (8 × 5) = 40 small divisions.

∴ The time is 4:40.

We can also express it as 40 minutes past 4.

Clearly, it is 20 minutes less to be 5 o'clock.

∴ We also say that the time is 20 minutes to 5.

Thus, we can express the above time in three ways.

4:40 or 40 minutes past 4 or 20 minutes to 5

Example 3: Look at the figure of the clock. What time does it show?

Solution: In this clock, the hour hand is between 9 and 10.

So, the time is between 9 o'clock and 10 o'clock.

The minute hand is at 6.

So, the minute hand has moved (6 × 5) = 30 small divisions.

∴ The time is 9:30.

We can also express it as: 30 minutes past 9.

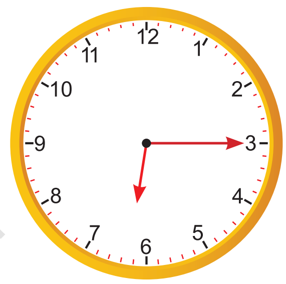
Clearly, it is 30 minutes less to be 10 o'clock.

∴ We also say that the time is 30 minutes to 10.

Thus, we can express the above time in four ways.

9:30 or 30 minutes past 9 or Half past 9 or 30 minutes to 10

Example 4: Look at the figure of the clock. What time does it show?



Solution: In this clock, the hour hand is between 6 and 7.

So, the time is between 6 o'clock and 7 o'clock.

The minute hand is at 3.

So, the minute hand has moved $(3 \times 5) = 15$ small divisions.

∴ The time is 6:15.

We can read it as 15 minutes past 6.

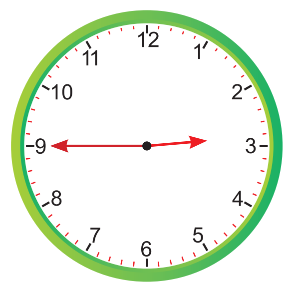
But, 15 minutes = Quarter of an hour.

∴ The time is: Quarter past 6.

Thus, we can express the above time as:

6:15 or 15 minutes past 6 or Quarter past 6

Example 5: What time does the given clock show?



Solution: In this clock, the hour hand is between 2 and 3.

So, the time is between 2 o'clock and 3 o'clock.

The minute hand is at 9.

So, the minute hand has moved $(9 \times 5) = 45$ small divisions.

∴ The time is 2:45.

We can also express it as: 45 minutes past 2.

Clearly, it is 15 minutes less to be 3 o'clock.

∴ We can say that the time is: Quarter to 3.

Thus, we can express the above time as:

2:45 or 45 minutes past 2 or Quarter to 3

Example 6: Look at the figure of the clock. What time does it show?

Solution: In this figure, the hour hand is between 3 and 4.

So, the time is between 3 o'clock and 4 o'clock.

The minute hand is 3 small divisions ahead of the number 9.

Thus, the minute hand has moved $(5 \times 9 + 3) = 48$ small divisions.

$\therefore$ The time is 3:48.

The other way of expressing it is 48 minutes past 3 or simply 48 past 3.

Clearly, it is 12 minutes less to be 4 o'clock.

$\therefore$ We also say that the time is 12 minutes to 4 or simply 12 to 4.

Thus, we can express the above time in 3 ways.

3:48 or 48 minutes past 3 or 12 minutes to 4

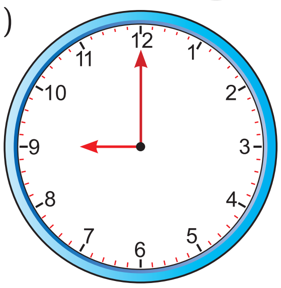
Exercise 62

1. Fill in the blanks. One has been done for you.

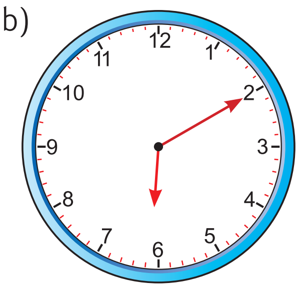
	Hour hand	Minute hand	Time is
(a)	at 8	at 12	8 o'clock
(b)	at 6	at 12	.... o'clock
(c)	at 11	at 12	.... o'clock
(d)	at 7	at 12	.... o'clock
(e)	at 12	at 12	.... o'clock

2. Look at the figure of each clock and write down the time shown by it in two different ways.

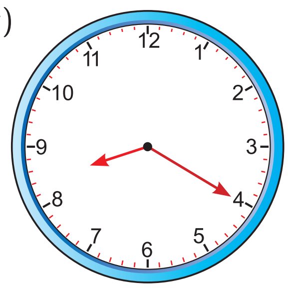
(a)

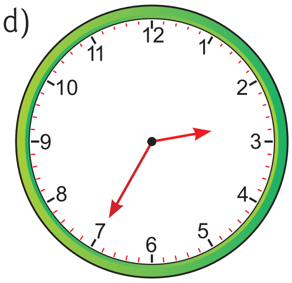


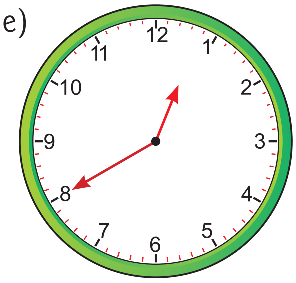
(b)

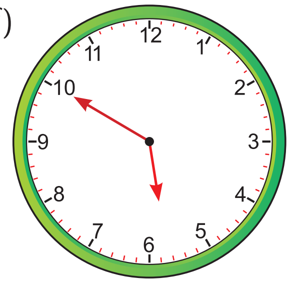


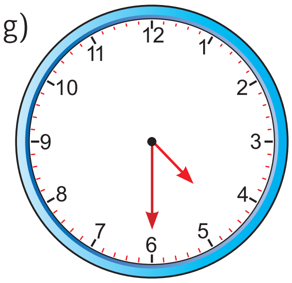
(c)

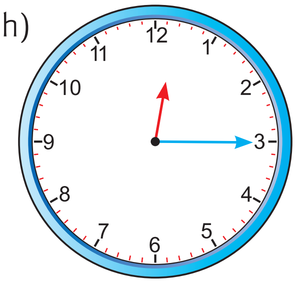


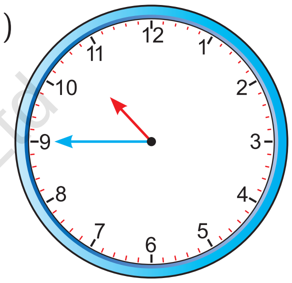
(d) 

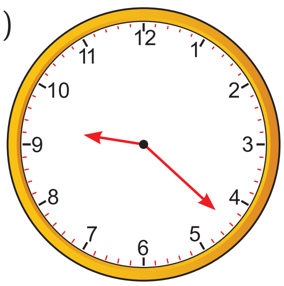
(e) 

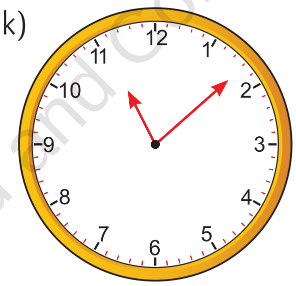
(f) 

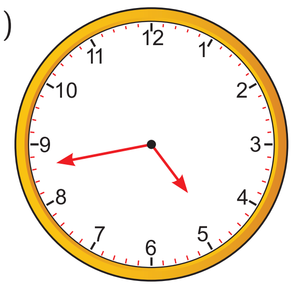
(g) 

(h) 

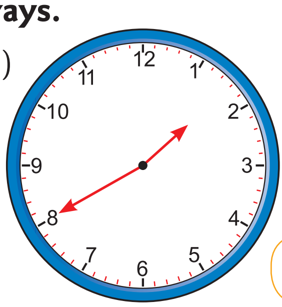
(i) 

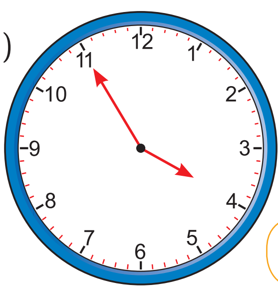
(j) 

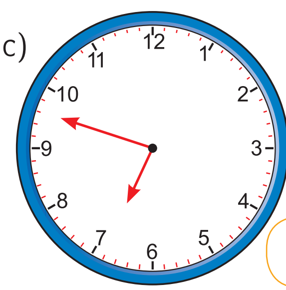
(k) 

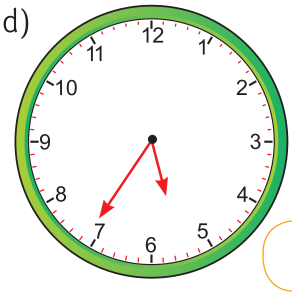
(l) 

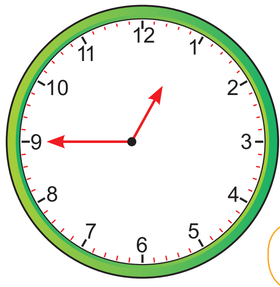
3. Look at the figure of each clock and write down the time shown by it in three different ways.

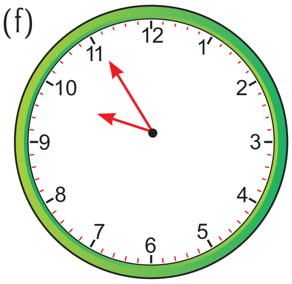
(a) 

(b) 

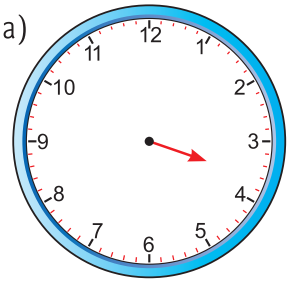
(c) 

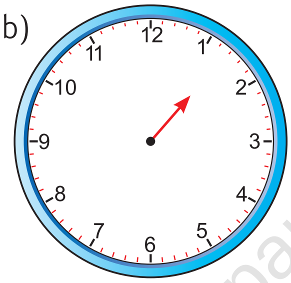
(d)


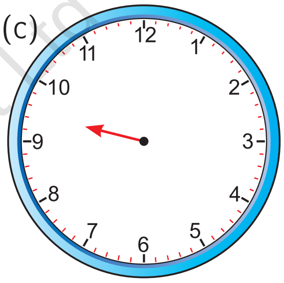
(e)


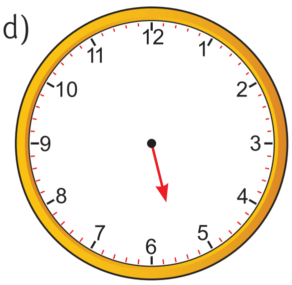
(f)


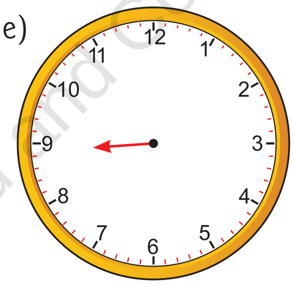
4. The time is given to you and the hour hand is drawn. Draw the minute hand to show the correct time.

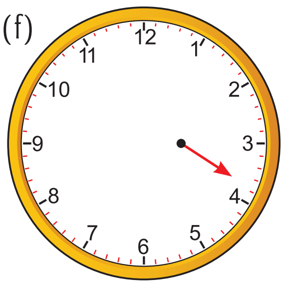
(a)

3 : 25

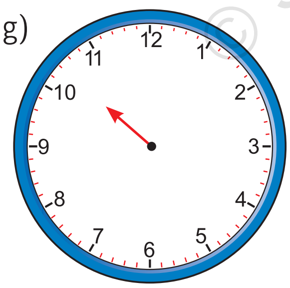
(b)

20 minutes past 1

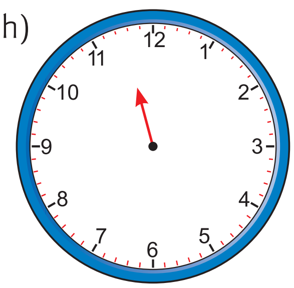
(c)

17 minutes past 9

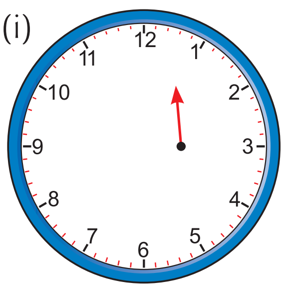
(d)

25 minutes to 6

(e)

8 minutes to 9

(f)

Quarter to 4

(g)

Quarter past 10

(h)

Half past 11

(i)

9 minutes to 12

5. Write the following time in figures.

(a) 5 o'clock
(b) 25 minutes past 7
(c) 38 minutes past 11
(d) Quarter past 4
(e) Half past 9
(f) 10 minutes to 6
(g) 23 minutes to 2
(h) Quarter to 7

6. Fill in the blanks.

(a) 40 minutes past 5 = ... minutes to 6.

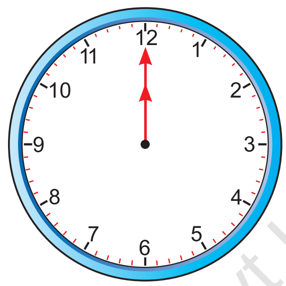
(b) 34 minutes past 11 = ... minutes to 12.

(c) 53 minutes past 8 = ... minutes to ....

(d) Quarter to 7 = ... minutes past ....

(e) 14 minutes to 9 = ... minutes past ....

Use of a.m. and p.m.



Look at the figure of the clock.

In this figure, both the hands of the clock are at 12.

The time is 12 o'clock.

It may be in the noon or at midnight.

If it is in the noon, we say that the time is 12 noon.

If it is at midnight, we say that the time is 12 midnight.

A day begins at 12 midnight and ends at 12 midnight on the following day.

Time between 12 midnight and 12 noon is denoted by a.m.

a.m. stands for ante-meridian.

Thus, 4 a.m. refers to 4 o'clock in the morning.

Time between 12 noon and 12 midnight is denoted by p.m.

p.m. stands for post-meridian.

Thus, 4 p.m. refers to 4 o'clock in the evening.

9 p.m. refers to 9 o'clock at night.

Example 1: Write the time using a.m. or p.m.

(a) 7:15 in the morning (b) 8:10 in the evening

(c) 10:10 at night (d) 30 minutes after midnight

(e) 12:05 in the afternoon (f) 1:30 after midnight

Solution: We have:

(a) 7:15 a.m. (b) 8:10 p.m. (c) 10:10 p.m.

(d) 0:30 a.m. (e) 12:05 p.m. (f) 1:30 a.m.

Example 2: What time will it be

(a) 5 hours after 10 a.m.?

(b) 3 hours after 11 p.m.?

Solution: (a) 2 hours after 10 a.m. will be 12 noon.

3 hours after 12 noon will be 3 p.m.

∴ 5 hours after 10 a.m. will be 3 p.m.

(b) 1 hour after 11 p.m. will be 12 midnight.

2 hours after 12 midnight will be 2 a.m.

∴ 3 hours after 11 p.m. will be 2 a.m.

Exercise 63

1. Write the time using a.m. or p.m.

(a) 1 hour after 12 midnight
(b) 2 hours 30 minutes after 12 noon
(c) 18 minutes after the midnight
(d) 12:30 in the afternoon
(e) 6:25 in the evening
(f) 7:40 in the morning
(g) 9:50 at night
(h) 1:05 after midnight
(i) 45 minutes after midnight
(j) 15 minutes after 12 noon

2. What time will it be?

(a) 3 hours after 6:30 a.m.
(b) 4 hours after 7:40 p.m.
(c) 3 hours 15 minutes after 9 a.m.
(d) 4 hours 20 minutes after 8 p.m.
(e) 2 hours 30 minutes after 10 : 30 a.m.
(f) 10 hours after 1 a.m.
(g) 50 minutes before 5:05 a.m.
(h) 30 minutes before 12 midnight.
(i) 40 minutes before 12 noon
(j) 40 minutes after 11:20 p.m.
(k) 50 minutes after 11:10 a.m.

3. Fill in the blanks with a.m. or p.m.

(a) I get up from the bed at 5:00 ....
(b) Sun sets at 6:45 ....
(c) Sudhir goes to the school at 7:30 ....
(d) Mr Khanna is back from his office at 7:00 ....
(e) I go to bed at 10:30 ....
(f) I brush my teeth at 5:30 ....

Duration of an Activity

We know that: 1 hour = 60 minutes.

I. Time Duration (in Minutes)

Example 1. Reena left her house for school at 9:05 a.m. and reached school at 9:45 a.m. How much time did she take to reach school from her house?

Solution: Time taken = Duration from 9:05 a.m. to 9:45 a.m.

= 45 minutes – 5 minutes

= 40 minutes.

Example 2: A bus left Ghaziabad at 5:40 p.m. and reached Delhi at 6:25 p.m. How much time did the bus take to reach Delhi from Ghaziabad?

Solution: Time taken by the bus to reach Delhi

= Duration from 5:40 p.m. to 6:25 p.m.

= (Duration from 5:40 p.m. to 6:00 p.m.)

+ (Duration from 6:00 p.m. to 6:25 p.m.)

= 20 minutes + 25 minutes

= 45 minutes.

II. Time Duration (in Hours and Minutes)

Example 3: Deepak's school starts at 8:10 a.m. and closes at 1:40 p.m. How long does the school work?

Solution: We find the duration from 8:10 a.m. to 1:40 p.m. as shown below.

Time Period	Duration
8:10 a.m. to 9:00 a.m.	50 minutes
9:00 a.m. to 1:00 p.m.	4 hours
1:00 p.m. to 1:40 p.m.	40 minutes
	4 hours 90 minutes

But, 4 hours 90 minutes = 4 hours + 90 minutes

= 4 hours + 60 minutes + 30 minutes

= 4 hours + 1 hour + 30 minutes

= 5 hours 30 minutes

So, the school works for 5 hours 30 minutes.

Example 4: Tanya goes to bed at 9:50 p.m. and gets up next morning after 8 hours 25 minutes. At what time did she get up?

Solution: Time 8 hours after 9:50 p.m. is 5:50 a.m.

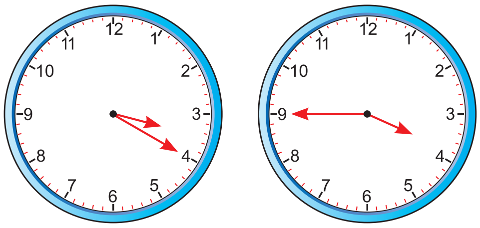
Time 25 minutes after 5:50 a.m. is 6:15 a.m.

Hence, Tanya got up at 6:15 a.m.

Exercise 64

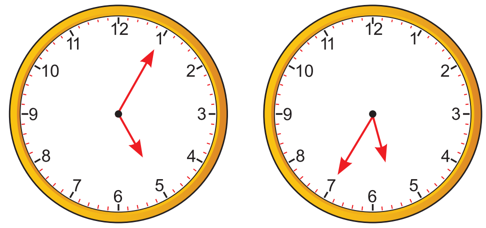
1. How many minutes have passed from clock A to clock B?

(a)



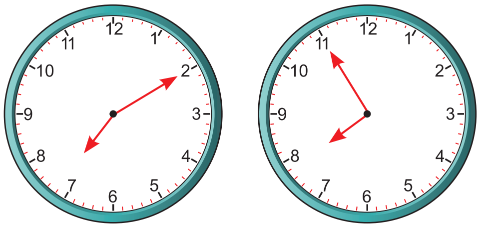
Clock A Clock B

(b)



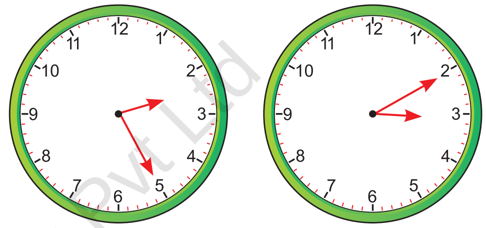
Clock A Clock B

(c)



Clock A Clock B

(d)



Clock A Clock B

2. How many minutes pass between:

(a) 12 o' clock and quarter past 12?

(b) 4 o' clock and quarter to 5?

(c) Quarter past 6 and 10 minutes to 7?

(d) Half past 10 and quarter past 11?

3. Amit took part in a cycle race. He started at 1:25 p.m. and reached the finishing line at 1:50 p.m. What was the duration of the race?

4. Sajal started doing his homework at 4:35 p.m. He finished it at 5:15 p.m. How long did it take him to do the homework?

5. A tap was opened into an empty tank at 9:20 a.m. The tank was full at 10:15 a.m. How long did it take to fill the empty tank?

6. Calculate the time:

(a) from 6 a.m. to 10:40 a.m. on the same day

(b) from 9:25 a.m. to 1:40 p.m. on the same day

(c) from 6:23 a.m. to 3:07 p.m. on the same day

(d) from 10:15 p.m. on one day to 5:05 p.m. on the next day

(e) from 7:55 a.m. on one day to 4:20 a.m. on the next day

7. Tarun drove to his friend's house. He left at 10:40 a.m. and reached at 2:25 p.m. How many hours and minutes did the journey take?

8. A painting competition started at 11:45 a.m. and finished at 1:35 p.m. How long did the competition last?

9. A school starts at 7:20 a.m. It works for 5 hours 20 minutes. When does the school close?

10. A train leaves Mumbai at 4:10 p.m. and reaches Surat after 2 hours 55 minutes. At what time does the train reach Surat?

Conversion of Days into Hours

We know that: 1 day = 24 hours

Rule: To convert days into hours, we multiply the number of days by 24.

Thus, 3 days = (3×24) hours = 72 hours.

Conversion of Hours into Minutes

We know that: 1 hour = 60 minutes

Rule: To convert hours into minutes, we multiply the number of hours by 60.

Thus, 2 hours = (2×60) minutes = 120 minutes.

Conversion of Minutes into Seconds

We know that: 1 minute = 60 seconds

Rule: To convert minutes into seconds, we multiply the number of minutes by 60.

Thus, 5 minutes = (5×60) seconds = 300 seconds.

Solved Examples

Example 1: Convert into hours.

(a) 5 days (b) 8 days (c) 30 days

Solution: (a) 1 day = 24 hours

∴ 5 days = (5×24) hours

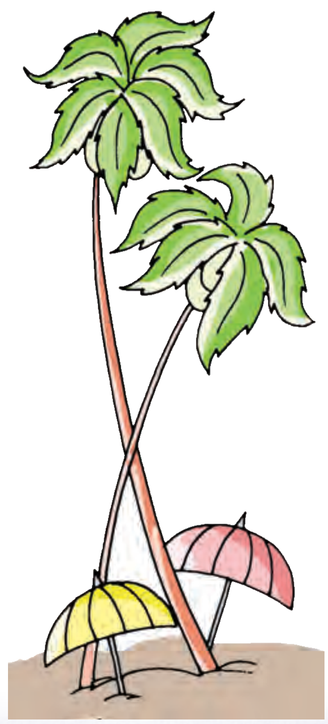
= 120 hours.

(b) 1 day = 24 hours

∴ 8 days = (8×24) hours = 192 hours.

(c) 1 day = 24 hours

∴ 30 days = (30×24) hours = 720 hours.



Example 2: Convert the following into minutes.

(a) 7 hours (b) 6 hours 35 minutes

Solution: (a) 1 hour = 60 minutes

∴ 7 hours = (7×60) minutes = 420 minutes.

(b) 6 hours 35 minutes = (6×60) minutes + 35 minutes

= 360 minutes + 35 minutes

= 395 minutes.

Example 3: Convert the following into seconds.

(a) 12 minutes (b) 5 minutes 24 seconds

Solution: We have:

(a) 1 minute = 60 seconds

$\therefore$ 12 minutes = (12×60) seconds = 720 seconds.

(b) 5 minutes 24 seconds = (5×60) seconds + 24 seconds

= 300 seconds + 24 seconds

= 324 seconds.

Example 4: Convert 4 hours into seconds.

Solution: 4 hours = (4×60) minutes

= 240 minutes

= (240×60) seconds = 14400 seconds.

Exercise 65

1. **Convert the following into hours.**

(a) 4 days (b) 7 days (c) 16 days

(d) 20 days (e) 3 days 18 hours (f) 2 days 6 hours

2. **Convert the following into minutes.**

(a) 8 hours (b) 12 hours

(c) 24 hours (d) 4 hours 10 minutes

(e) 6 hours 50 minutes (f) 11 hours 25 minutes

(g) 14 hours 5 minutes (h) 16 hours 30 minutes

(i) 20 hours 20 minutes

3. **Convert the following into seconds.**

(a) 16 minutes (b) 23 minutes

(c) 6 minutes 45 seconds (d) 8 minutes 30 seconds

(e) 10 minutes 16 seconds (f) 5 hours

The 24-Hour Clock Time

Some departments like the Railways and the Airlines use 24-hour clock time in their Time-tables.

In such a system, the time is written in four digits. The first two digits on the left show hours while the next two digits show minutes. We do not use dots to separate hours and minutes.

In place of the digits 1, 2, 3,..., 9 used in 12-hour clock, we use 01, 02, 03,..., 09 respectively in a 24-hour clock.

Representation of Various Times in Two types of Clocks

Time from Midnight to Noon

12-Hour Clock Time	24-Hour Clock Time
12: 00 midnight	0000 hours
12:05 a.m.	0005 hours
12:59 a.m.	0059 hours
1:00 a.m.	0100 hours
2:30 a.m.	0230 hours
6:45 a.m.	0645 hours
9:10 a.m.	0910 hours
11:24 a.m.	1124 hours
11:59 a.m.	1159 hours
12:00 noon	1200 hours

Time after 12:00 Noon and before 1:00 p.m.

12-Hour Clock Time	24-Hour Clock Time
12:01 p.m.	1201 hours
12:38 p.m.	1238 hours
12:59 p.m.	1259 hours

Time from 1:00 p.m. and up to 12:00 Midnight

12-Hour Clock Time	24-Hour Clock Time
1:00 p.m.	1300 hours
1:55 p.m.	1355 hours
4:15 p.m.	1615 hours
9:30 p.m.	2130 hours
10:52 p.m.	2252 hours
11:59 p.m.	2359 hours
12:00 midnight	2400 hours or 0000 hours

Rules to Convert 24-hour Clock Time to 12-hour Clock Time

Rule 1: If the number formed by the first two digits from the left of a 24-hour clock time is less than 12, then it denotes the number of hours before noon and so a.m. is to be used with it.

Thus, (a) 0335 hours denotes 3:35 a.m. (b) 0810 hours denotes 8:10 a.m.

(c) 1045 hours denotes 10:45 a.m.

Rule 2: If the number formed by the first two digits from the left of a 24-hour clock time is more than 12, the difference between the number and 12 gives the number of hours after noon and so p.m. is to be used with it.

Thus, (a) 1805 hours denotes 6:05 p.m. (b) 2115 hours denotes 9:15 p.m.

(c) 2350 hours denotes 11:50 p.m.

Rule 3: If the number formed by the first two digits from the left of a 24-hour clock time is 12 (other than 1200), it shows time after noon and so p.m. is to be used with it.

Thus, (a) 1220 hours denotes 12:20 p.m. (b) 1236 hours denotes 12:36 p.m.

(c) 1252 hours denotes 12:52 p.m.

Solved Examples

Example 1: Change the 12-hour clock time given below to 24-hour clock time.

(a) 12 midnight (b) 12:45 a.m. (c) 3:36 a.m. (d) 4:45 p.m.

(e) 12:15 p.m. (f) 8:40 p.m. (g) 12:28 p.m. (h) 6:30 a.m.

(i) 12:55 p.m. (j) 7:35 p.m. (k) 11:43 p.m. (l) 12:00 noon

Solution: We have:

	12-hour clock time	24-hour clock time
(a)	12 midnight	0000 hours
(b)	12:45 a.m.	0045 hours
(c)	3:36 a.m.	0336 hours
(d)	4:45 p.m.	1645 hours
(e)	12:15 p.m.	1215 hours
(f)	8:40 p.m.	2040 hours
(g)	12:28 p.m.	1228 hours
(h)	6:30 a.m.	0630 hours
(i)	12:55 p.m.	1255 hours
(j)	7:35 p.m.	1935 hours
(k)	11:43 p.m.	2343 hours
(l)	12:00 noon	1200 hours

Example 2: Change the given 24-hour clock time to 12-hour clock time.

(a) 0058 hours	(b) 1245 hours	(c) 1700 hours	(d) 0456 hours
(e) 0400 hours	(f) 2335 hours	(g) 1440 hours	(h) 0820 hours
(i) 1840 hours	(j) 0123 hours	(k) 0024 hours	(l) 0315 hours

Solution: We have:

	24-hour clock time	12-hour clock time
(a)	0058 hours	12:58 a.m.
(b)	1245 hours	12:45 p.m.
(c)	1700 hours	5:00 p.m.
(d)	0456 hours	4:56 a.m.
(e)	0400 hours	4:00 a.m.
(f)	2335 hours	11:35 p.m.
(g)	1440 hours	2:40 p.m.
(h)	0820 hours	8:20 a.m.
(i)	1840 hours	6:40 p.m.
(j)	0123 hours	1:23 a.m.
(k)	0024 hours	0:24 a.m.
(l)	2015 hours	8:15 p.m.

Exercise 66

1. Change the time given below to 24-hour clock time.

(a) 6:30 a.m.	(b) 6:30 p.m.	(c) 12:30 a.m.	(d) 12:30 p.m.
(e) 12:55 a.m.	(f) 12:55 p.m.	(g) 1:25 a.m.	(h) 4:25 p.m.
(i) 11:50 a.m.	(j) 11:50 p.m.	(k) 2:30 p.m.	(l) 3:30 a.m.

2. Change the time given below to 12-hour clock time.

(a) 0332 hours	(b) 2120 hours	(c) 0630 hours	(d) 0035 hours
(e) 1250 hours	(f) 0030 hours	(g) 1840 hours	(h) 2105 hours
(i) 1136 hours	(j) 2328 hours	(k) 0155 hours	(l) 1045 hours

Addition and Subtraction of Time

Example 1: Add 5 hours 40 minutes and 3 hours 8 minutes.

Solution: Put the given measures in columns of hours and minutes and add columnwise.

Step 1: Add the minutes:

40 minutes + 08 minutes = 48 minutes.

Write 48 under minutes column.

Step 2: Add the hours:

5 hours + 3 hours = 8 hours.

Write 8 under hours column.

∴ Required sum = 8 hours 48 minutes.

	Hrs	Min
	5	40
+	3	08
	8	48

Example 2: Add 6 hours 50 minutes and 5 hours 35 minutes.

Solution: Put the given measures in columns of hours and minutes and add columnwise.

Step 1: Add the minutes:

50 minutes + 35 minutes = 85 minutes

= 60 minutes + 25 minutes

= 1 hour + 25 minutes

Write 25 under minutes column and carry over 1 to hours column.

Step 2: Add the hours:

6 hours + 5 hours + 1 hour (carried over) = 12 hours.

Write 12 under hours column.

∴ Required sum = 12 hours 25 minutes.

	Hrs	Min
	1	
	6	50
+	5	35
	12	25

Example 3: Add 38 minutes 46 seconds and 10 minutes 38 seconds.

Solution: Put the given measures in columns of minutes and seconds and add columnwise.

Step 1: Add the seconds:

46 seconds + 38 seconds = 84 seconds

= 60 seconds + 24 seconds

= 1 minute + 24 seconds.

Write 24 under seconds column and carry over 1 to minutes column.

Step 2: Add the minutes:

38 minutes + 10 minutes + 1 minute (carried over) = 49 minutes.

Write 49 under minutes column.

∴ Required sum = 49 minutes 24 seconds.

	Min	Sec
	1	
	38	46
+	10	38
	49	24

Example 4: Add 5 hours 42 minutes 54 seconds and 2 hours 36 minutes 28 seconds.

Solution: Put the given measures in columns of hours, minutes and seconds and add columnwise (as given below).

Step 1: Add the seconds:

54 seconds + 28 seconds = 82 seconds

= 60 seconds + 22 seconds

= 1 minute + 22 seconds.

Write 22 under seconds column and carry over 1 to minutes column.

	Hrs	Min	Sec
	1	1	1
	5	42	54
+	2	36	28
	8	19	22

Step 2: Add the minutes:

42 minutes + 36 minutes + 1 minute (carried over)

= 79 minutes

= 60 minutes + 19 minutes

= 1 hour + 19 minutes.

Write 19 under minutes column and carry over 1 to hours column.

Step 3: Add the hours:

5 hours + 2 hours + 1 hour (carried over) = 8 hours.

Write 8 under hours column.

∴ Required sum = 8 hours 19 minutes 22 seconds.

Example 5: Subtract 3 hours 25 minutes from 8 hours 5 minutes.

Solution: Put the given measures in columns of hours and minutes and subtract columnwise as given below.

Step 1: Subtract the minutes:

We cannot subtract 25 minutes from 05 minutes.

So, borrow 1 hour, leaving behind 7 hours and making 65 minutes.

Now, 65 minutes – 25 minutes = 40 minutes.

Write 40 under minutes column.

	Hrs	Min
	7	65
	~~8~~	~~05~~
–	3	25
	4	40

Step 2: Subtract the hours:

7 hours – 3 hours = 4 hours.

Write 4 under hours column.

∴ Required difference = 4 hours 40 minutes.

Example 6: Subtract 6 minutes 25 seconds from 10 minutes 18 seconds.

Solution: Put the given measures in columns of minutes and seconds and subtract columnwise.

Step 1: Subtract the seconds:

We cannot subtract 25 seconds from 18 seconds.

So, we borrow 1 minute, leaving behind 9 minutes.

Now, 1 minute + 18 seconds = 60 seconds + 18 seconds

= 78 seconds.

And, 78 seconds – 25 seconds = 53 seconds.

Write 53 under seconds column.

	Min	Sec
	9	78
	~~10~~	~~18~~
–	6	25
	3	53

Step 2: Subtract the minutes:

9 minutes – 6 minutes = 3 minutes.

∴ Required difference = 3 minutes 53 seconds.

Exercise 67

Add by writing in columns.

1. 8 hours 15 minutes and 6 hours 35 minutes
2. 6 hours 45 minutes and 8 hours 25 minutes
3. 10 hours 38 minutes and 7 hours 52 minutes
4. 14 hours 36 minutes and 5 hours 48 minutes
5. 25 minutes 28 seconds and 7 minutes 2 seconds
6. 18 minutes 45 seconds and 14 minutes 35 seconds
7. 20 minutes 53 seconds and 18 minutes 27 seconds
8. 5 hours 20 minutes 35 seconds and 6 hours 36 minutes 25 seconds
9. 8 hours 34 minutes 28 seconds and 5 hours 45 minutes 42 seconds
10. 9 hours 9 minutes 9 seconds and 11 hours 54 minutes 54 seconds

Subtract by writing in columns.

11. 4 hours 43 minutes from 8 hours 30 minutes
12. 9 hours 36 minutes from 14 hours 24 minutes
13. 8 hours 48 minutes from 17 hours 30 minutes
14. 6 minutes 44 seconds from 8 minutes 12 seconds
15. 8 minutes 30 seconds from 17 minutes

Things to Remember

1. A clock has two hands – a longer hand called the minute hand and a shorter hand called the hour hand.
2. The minute hand goes once round the dial in 1 hour and thus completes 24 rounds in a day.
3. The hour hand takes 12 hours to complete one round and thus completes 2 rounds in a day.
4. A day begins at 12 midnight and ends at 12 midnight on the following day.
5. Time between 12 midnight and 12 noon is denoted by a.m.
6. Time between 12 noon and 12 midnight is denoted by p.m.
7. 1 day = 24 hours, 1 hour = 60 minutes and 1 minute = 60 seconds.
8. In a 24-hour clock system four digits are used to indicate time. The first two digits show the hours and the last two digits the minutes.

C.C.E. Drill 15

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. 17 minutes to 8 is the same as

(a) 7 : 41 (b) 7 : 43 (c) 7 : 47 (d) 7 : 53

2. The interval between 9 : 30 a.m. and 3 : 30 p.m. is

(a) 5 hours (b) 6 hours (c) 7 hours (d) 8 hours

3. 2 hours 30 minutes = ... minutes.

(a) 90 (b) 120 (c) 150 (d) 180

4. 8 hours 50 minutes = ... minutes.

(a) 242 (b) 450 (c) 510 (d) 530

5. 6 : 30 p.m. is the same as

(a) 0630 hours (b) 1230 hours (c) 1630 hours (d) 1830 hours

6. How many seconds are there in 1 hour?

(a) 60 (b) 360 (c) 2160 (d) 3600

7. In the 24-hour clock the time corresponding to 1 p.m. is .... hours.

(a) 1000 (b) 0100 (c) 1200 (d) 1300

8. In the 24-hour clock the time corresponding to 12 noon is .... hours.

(a) 0000 (b) 1200 (c) 1800 (d) 2400

9. Which of the following gives the number of minutes in a day?

(a) 24 (b) 24×60 (c) $24 \times 60 \times 60$ (d) 60×60

10. .... hand moves the fastest in a clock.

(a) Hour (b) Minute (c) Seconds (d) None of these

11. The interval between 7:15 p.m. and 10:10 p.m. is

(a) 2 hours (b) 2 hours 55 minutes

(c) 3 hours (d) 3 hours 55 minutes

12. 7 days 7 hours = ... hours

(a) 77 (b) 91 (c) 168 (d) 175

13. Anti-meridian (a.m.) and post-meridian (p.m.) are .... words.

(a) Indian (b) Greek (c) French (d) Roman

14. 2320 hours denotes

(a) 9:20 p.m. ◯ (b) 9:20 a.m. ◯ (c) 11:20 a.m. ◯ (d) 11:20 p.m. ◯

15. What time was it 3 hours 30 minutes before 12 noon?

(a) 8:30 a.m. ◯ (b) 8:40 a.m. ◯ (c) 9:30 a.m. ◯ (d) 9:30 p.m. ◯

16. The difference between 8 hours 20 minutes and 3 hours 45 minutes is

(a) 4 hours 35 minutes ◯ (b) 4 hours 25 minutes ◯

(c) 5 hours 35 minutes ◯ (d) 5 hours 25 minutes ◯

QUESTION BAG 2

1. **Fill in the blanks.**

(a) 8:49 may be written as .... minutes to 9.

(b) 7 hours have .... minutes.

(c) 3:15 at night is 3:15 ....

(d) 1400 hours is the same as ....

2. **Put the correct symbol >, < or = in the placeholder.**

(a) 1 hour 50 minutes ◯ 150 minutes (b) 2 hours 8 minutes ◯ 28 minutes

(c) 8 hours ◯ 400 minutes (d) 5 hours 20 minutes ◯ 250 minutes

(e) 6 hours ◯ 350 minutes (f) 5 days ◯ 100 hours

(g) 2 hours 20 minutes ◯ 220 minutes

3. **Find the time lapse between:**

(a) School starting at 7:45 a.m. and finishing at 2:20 p.m.

(b) The bus arriving at 10:30 a.m. and leaving at 3:15 p.m.

(c) Amit sleeping at 9:40 p.m. and waking up at 5:30 a.m.

4. **Complete the following table.**

	12-hour clock	24-hour clock
(a)	9:15 p.m.	
(b)		2348 hours
(c)		0020 hours
(d)	12:15 p.m.	
(e)	3:35 p.m.	
(f)	12 midnight	
(g)	12:25 a.m.	
(h)		1450 hours

5. **Solve:**

(a)

	Hrs	Min
	28	36
+	8	48

(b)

	Hrs	Min
	16	56
+	19	37

(c)

	Hrs	Min
	35	38
+	17	46

(d)

	Hrs	Min	Sec
	6	28	47
+	7	45	29

(e)

	Hrs	Min
	16	00
−	8	24

(f)

	Hrs	Min
	10	13
−	4	56

(g)

	Hrs	Min	Sec
	12	25	22
−	3	35	34

(h)

	Hrs	Min	Sec
	14	18	25
−	6	30	48

19 Calendar

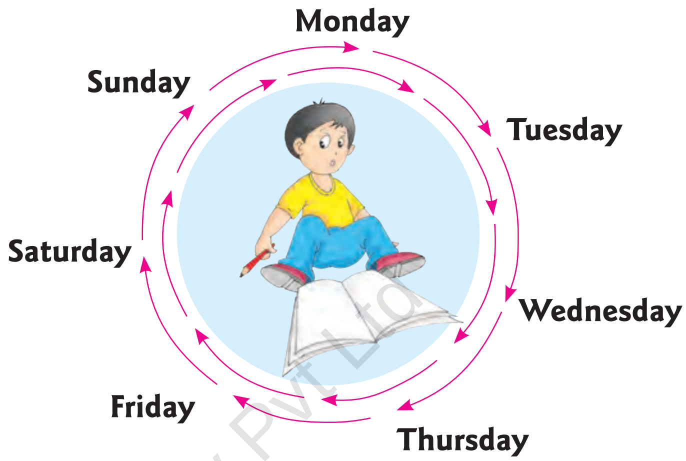
Days of the Week

We know that there are 7 days in a week.

A week starts with Monday and ends at Sunday, after which again comes Monday.

The same cycle goes on repeating.

Note that the same day comes after 7 days.



Months of the Year

There are 12 months in a year.

Month	Number of days
January	31
February	28 or 29
March	31
April	30
May	31
June	30
July	31
August	31
September	30
October	31
November	30
December	31

Ordinary and Leap Years

Century: The year divisible by 100 is called a century.

Thus, each one of the years 1800, 1900, 2000, 2100 is a century.

Leap Year: The year, other than a century, divisible by 4 as well as century divisible by 400 is called a leap year.

Examples: (i) Each of the years 2000, 2004, 2008, 2012, 2016 is a leap year.

(ii) Out of the years 1900, 1991, 1995, 1997, 2010, 2011, 2013, 2015 no one is a leap year.

> February of a leap year has 29 days.
> There are 366 days in a leap year.

Ordinary Year: The year which is not a leap year is called an ordinary year.

Thus, each one of the years 1900, 1993, 1994, 1995, 1997, 1999, 2006, 2013, 2100 is an ordinary year.

> February of an ordinary year has 28 days.
> There are 365 days in an ordinary year.

Let us now compute the number of weeks in a leap year and an ordinary year.

We know that a leap year has 366 days, and a week has 7 days.

On dividing 366 by 7, we get: quotient = 52, remainder = 2.

So, we can say that:

A leap year has 52 weeks and 2 days.

Now, an ordinary year has 365 days.

On dividing 365 by 7, we get: quotient = 52, remainder = 1.

So, we can say that:

An ordinary year has 52 weeks and 1 day.

Thus, a year has 52 full weeks.

Need for Leap Year

A year represents the time taken by the Earth to complete one revolution round the Sun.

Now, the Earth takes nearly 365 days and 6 hours to complete one revolution round the sun. For the sake of convenience the year is rounded off as 365 days. The leftover 6 hours are accumulated and added after every 4 years as $(6 \times 4) = 24$ hours or 1 extra day in the month of February. Thus, a leap year occurs once in four years.

How to Write Dates?

When we write a date for a particular day in a year, we specify the number of the day in a month (*i.e.*, date), the name of the month and then the year.

Examples: 1st January, 2016 or January 1, 2016.

2nd February, 2016 or February 2, 2016.

13th August, 2016 or August 13, 2016.

In short, we write a date as a group of 3 numbers, separated by two dots. The first number stands for the day, the second number for the month (1 stands for January, 2 for February, 3 for March, ... and 12 for December) and the third for the year.

Thus, 12th October, 2016 shall be written in short form as:

12.	10.	2016
↓	↓	↓
Day	Month	Year

Calendar

Calendar is the record of all the dates and days of a year.

It, thus, shows the months, weeks and days in the year.

Look at the calendar for the year 2017 given below.

Calendar for 2017

JANUARY

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

FEBRUARY

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

MARCH

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

APRIL

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

MAY

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

JUNE

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

JULY

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

AUGUST

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

SEPTEMBER

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

NOVEMBER

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

DECEMBER

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Solved Examples

Example 1: Which of the following are leap years?

(a) 1994 (b) 2004 (c) 1900 (d) 2000

Solution: (a) 1994 is not a leap year, since 1994 is not divisible by 4.

(b) 2004 is a leap year, since 2004 is divisible by 4.

(c) 1900 is a century year. For it to be a leap year, it must be divisible by 400. But, 1900 is not divisible by 400.

So, 1900 is not a leap year.

(d) 2000 is a century year, divisible by 400. So, 2000 is a leap year.

Example 2: Look at the calendar for the year 2017 and answer the following questions.

(a) On what day does the Republic Day fall in the year 2017?

(b) Deepa was born on 13th January, 2017. What day was it?

(c) On what date was the third Friday in February, 2017?

Solution: (a) The Republic Day falls on 26th January every year. The day on 26th January, 2017 is Thursday. So, Republic Day falls on Thursday in 2017.

(b) From the calendar, we find that on 13th January, 2017 it is Friday.

So, Deepa was born on Friday.

(c) From the calendar, we find that the Fridays in February, 2017 fall on 3rd, 10th, 17th and 24th February.

So, the third Friday falls on 17th February.

Example 3: If 4th October in a certain year was Wednesday, what was the day on 27th October in that year?

Solution: We know that the same day is repeated after every 7 days.

So, the dates for Wednesday in October, after 4th were 11th, 18th and 25th.

Thus, 25th October was Wednesday.

Hence, 27th October was Friday.

Example 4: In a certain year, 5th May was Friday.

(a) What will be the day 7 days after 5th May of that year?

(b) What will be the day 51 days after 5th May of that year?

Solution: (a) Since the same day is repeated after every 7 days, so the day 7 days after 5th May is the same as that on 5th May.

So, this day must be Friday.

(b) The day 49 days after 5th May will be Friday (same day will repeat after 7, 14, 21, 28, ... or 49 days).

So, the day 51 days after 5th May will be Sunday.

Example 5: How many days are there from 21st March to 17th April?

Solution: Days left in March = 31 – 20 = 11.

Days in April = 17.

Total number of days = 11 + 17 = 28.

So, there are 28 days from 21st March to 17th April.

Example 6: Find the number of days from 18th February, 2016 to 9th September, 2016.

Solution: 2016 is divisible by 4. So, the year 2016 is a leap year.

Thus, February, 2016 has 29 days. Now, we have:

Days in February	=	29 – 17	=	12
Days in March	=			31
Days in April	=			30
Days in May	=			31
Days in June	=			30
Days in July	=			31
Days in August	=			31
Days in September	=			9
Total number of days	=			205

Hence, there are 205 days from 18th February, 2016 to 9th September, 2016.

Example 7. Pritam joined a factory on 10th January, 2016. He worked for 35 days. On what date did he leave the factory?

Solution: Let us count 35 days from 10th January onwards.

Period from 10th January to 31st January = 22 days.

Remaining days = (35 – 22) days = 13 days.

Period from 1st February to 13th February = 13 days.

So, Pritam left the factory on 14th February, 2016.

Example 8. Nisha's school was closed for summer vacation from May 6, 2016 onwards for 64 days. On what date did the school reopen?

Solution: Let us count 64 days from May 6, 2016 onwards.

May 6 to May 31		June 1 to June 30		July 1 to July 8	
26 days	+	30 days	+	8 days	= 64 days.

So, Nisha's school reopened on July 9, 2016.

Exercise 68

1. How many days are there in a leap year?
2. How many days are there in an ordinary year?
3. Which of the following are leap years?

   1990, 1996, 1998, 1987, 2000, 2100, 2104, 2200

4. Name the months having 30 days.
5. Name the months having 31 days.
6. **How many days are there in February.**

   (a) in a leap year?

   (b) in an ordinary year?
7. In a certain year, on 3rd December it was Sunday. On what other dates of that month does Sunday fall?
8. **If 2nd July, 2012 was Monday, what was the day on:**

   (a) 22nd July, 2012.

   (b) 9th August, 2012.
9. How many days are there from 19th June to 7th July?
10. Find the number of days from 8th January, 2014 to 3rd March, 2014.
11. Find the number of days from 29th January, 2013 to 15th April, 2013.
12. **Look at the calendar of the year 2017 and write the day corresponding to the following dates.**

    (a) 6.8.2017 (b) 10.11.2017 (c) 7.12.2017

    (d) 7.6.2017 (e) 30.1.2017 (f) 6.5.2017
13. The annual examination in a school started on April 3 and ended on April 28. How long did the examination continue?
14. Kamla's father left for Kolkata on January 7, 2011 and returned home on March 8, 2011. For how many days did he remain out of home?
15. A boy fell sick on February 12, 2010. He recovered from illness on April 8, 2010. For how many days did he remain sick?
16. Neeta's winter vacations were from 5th December, 2011 to 12th February, 2012. For how many days her school was closed?
17. Rajan took medical leave for 48 days from 13th August onwards. When did he rejoin his duty?
18. Prepare a calendar for the month of July, if it begins on Friday.

Things to Remember

1. There are 7 days in a week and 12 months in a year.
2. Months having 30 days each are April, June, September and November.
3. Months having 31 days are: January, March, May, July, August, October and December.
4. A year divisible by 4 as well as a century divisible by 400 is called a leap year.
5. The year which is not a leap year is called an ordinary year.
6. February of a leap year has 29 days. February of an ordinary year has 28 days.
7. A leap year has 366 days i.e., 52 weeks and 2 days.
8. An ordinary year has 365 days i.e., 52 weeks and 1 day.
9. Calendar is the record of all the days of the year.
10. After every 7 days, the same day is repeated.
11. Short form of 26th January, 2012 is 26.1.2012.

Activity Time

Activity 1

Ask each of your classmates his/her date of birth and make a list of the same as shown below.

S. No.	Name of student	Date of birth	
		In Figures	In Words
1.	Ashish Gupta	25.02.2002	25th February, 2002

Now, arrange the students in the increasing or decreasing order of their ages and find out:

(a) Who is the eldest student in the class?

(b) Who is the youngest student in the class?

(c) Calculate the age of each student in years, months and days.

Activity 2

Refer to your school diary or almanac and note down the dates of your summer break, autumn break, winter break and term-end break. Now, calculate the duration of each break and form a table as shown below.

Break	Period		Duration
	From	To	
Summer-break	16.05.2015	05.07.2015	51 days

C.C.E. Drill 16

QUESTION BAG 1

(Objective Type Questions)

Tick (✓) the correct answer.

1. How many full weeks are there in a year?

(a) 52 (b) 53 (c) 54 (d) 55

2. The month with neither 30 days nor 31 days is

(a) December (b) November (c) March (d) February

3. How many days will be there in 2 non-leap years?

(a) 730 (b) 731 (c) 732 (d) 734

4. Which of the following is a leap year?

(a) 2002 (b) 1982 (c) 2012 (d) 2014

5. How many months in a year have 31 days each?

(a) 6 (b) 7 (c) 8 (d) 9

6. The total number of days in the months of July and August is

(a) 60 (b) 61 (c) 62 (d) None of these

7. How many days were there from 10th February, 2012 to 20th March, 2012?

(a) 38 (b) 40 (c) 41 (d) 45

8. Which of the following is a leap year?

(a) 1600 (b) 1700 (c) 1800 (d) All of these

9. If January 26, 2013 is Saturday, then January 26, 2014 falls on ....

(a) Tuesday (b) Sunday (c) Wednesday (d) Thursday

10. Sameer joined a 3-week computer course that got over on August 4. When did it begin?

(a) July 4 (b) July 11 (c) July 13 (d) July 14

QUESTION BAG 2

1. Which of the following are not leap years? Circle them.

2010	1992	1970	1976	1978
1902	1920	1938	2012	2006

2. Fill in the blanks.

(a) The year 2012 had .... days.

(b) The year 2013 will have .... days.

(c) The last leap year was ....

(d) The next leap year will be ....

(e) If in a certain year 5th May is Sunday then 5th June falls on ....

(f) .... weeks together make a fortnight.

(g) A month has .... full weeks.

(h) A decade has .... years and a century has .... years.

(i) If in a certain year the month of September begins on Sunday, then it ends on ....

3. Complete the following table by filling the missing columns.

	Starting date	Duration	Finishing date
(a)	April 26	18 days	
(b)		39 days	November 5
(c)	September 19		December 22
(d)	December 30	50 days	
(e)		100 days	July 15

4. Calculate the number of days in a leap year.

(a) from January 27 to April 14

(b) from February 16 to June 1

5. Vinay's uncle came for a visit. He arrived on September 23 and left on October 18. How long did he stay?

6. Nalini started reading a novel on 18th August. It took her 21 days to finish reading it. On what day did she finish reading the novel?

20 Pictorial Representation of Data

To study certain patterns, we need to conduct surveys and collect information on a particular issue or topic.

Data

The information collected in the form of numerical figures in a survey are known as data.

When we represent this data in pictures, it is known as pictorial representation.

Pictographs

Pictures that represent information are called pictographs.

Suppose the following data were collected regarding number of milk bottles sold by a milk-booth on various days of the week from Monday to Saturday.

Day	Number of milk bottles sold
Monday	35
Tuesday	25
Wednesday	50
Thursday	30
Friday	45
Saturday	20

Let us present the above data pictorially.

We may choose a milk bottle as a symbol to represent this data.

Next, we shall choose a scale, as drawing 35 bottles or 50 bottles can be a cumbersome task. Let the figure of one milk bottle represent 5 such bottles.

Then, we shall draw $(35 \div 5) = 7$ figures for Monday, $(25 \div 5) = 5$ figures for Tuesday, $(50 \div 5) = 10$ figures for Wednesday, and so on.

Thus, we have the following pictograph for the above data:

Number of milk bottles sold by a milk booth on various days

One  represents 5 milk bottles.

Consider another example.

Following are the number of babies born in Hospitals A, B, C, D and E in the month of January 2017:

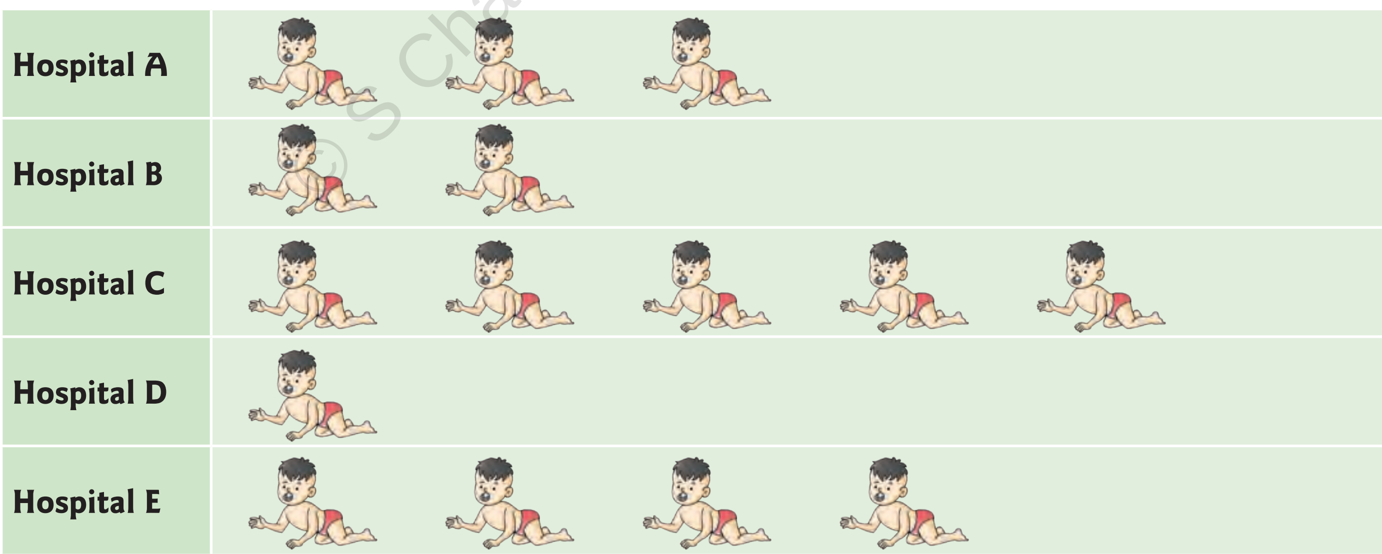
Hospital A → 21,	Hospital B → 14,	Hospital C → 35,
Hospital D → 7,	Hospital E → 28	

Observing the above data, we find that all the given numbers are multiples of 7.

So, we use 1 symbol to represent 7 babies.

Thus, we have the pictograph as shown below.

Number of babies born in different hospitals in January 2017



One  represents 7 babies

Exercise 69

In each of the following questions, represent the given information through a pictograph. First choose a symbol (a picture) to represent a certain number of items.

1. Number of students using different modes of transport to reach the school.

Bicycle	Car	Bus	Walking	Scooter
48	30	72	18	54

2. Number of students playing different games in the school.

Football	Cricket	Badminton	Volleyball	Basketball
40	60	35	50	45

3. Number of students of a class using different soaps.

Dettol	Dove	Lux	Pears	Cinthol
18	9	24	12	21

4. Number of students of different classes who can speak English.

Class I	Class II	Class III	Class IV	Class V	Class VI
28	20	24	36	52	32

5. Number of cars of a particular model produced by a factory between 2006 and 2010.

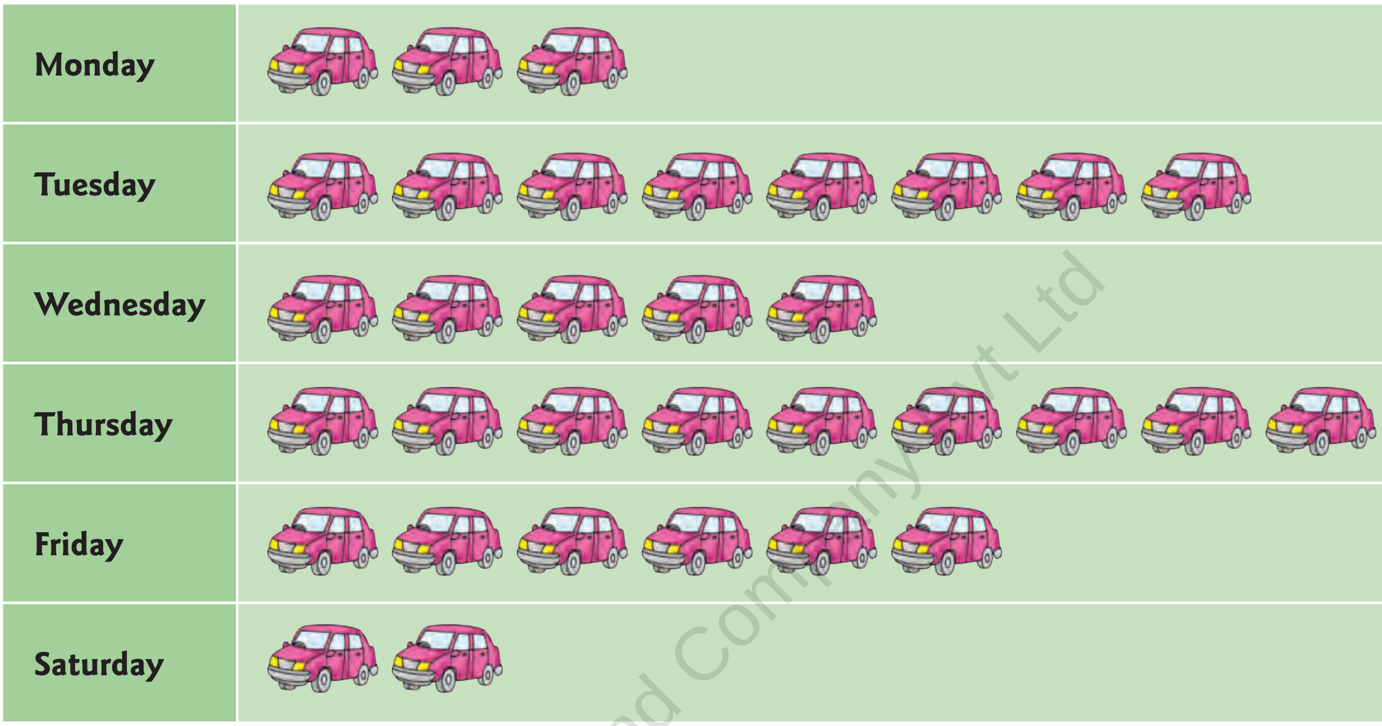
2006	2007	2008	2009	2010
35,000	40,000	45,000	30,000	35,000

Interpretation of a Pictograph

In this section, we shall learn to read a pictograph, analyse the data and answer the given questions.

Example: Below is given a pictograph showing the number of cars parked at a parking lot on six days of a week.

Number of cars parked



One  represents 5 cars.

From the pictograph, find:

1. How many cars were parked on
   (a) Tuesday (b) Thursday (c) Friday
2. On which day the maximum number of cars were parked at the parking lot?
3. On which day the minimum number of cars were parked at the parking lot?
4. How many more cars were parked on Friday than on Wednesday?
5. What was the total number of cars parked on all the six days?

Solution:

1. It is given that 1 symbol in the pictograph represents 5 cars.
   So, number of cars parked on a day = (Number of symbols) × 5
   (a) Number of cars parked on Tuesday = (8 × 5) = 40.
   (b) Number of cars parked on Thursday = (9 × 5) = 45.
   (c) Number of cars parked on Friday = (6 × 5) = 30.

2. Seeing the pictograph, we find that the largest number of symbols shown on a day is 9 on Thursday. So, the maximum number of cars were parked on Thursday.
3. Seeing the pictograph, we find that the least number of symbols shown on a day is 2, on Saturday. So, the minimum number of cars were parked on Saturday.
4. Difference in the number of symbols shown for Friday and Wednesday = (6 – 5) = 1. So, difference in the number of cars parked on Friday and Wednesday = (1 × 5) = 5.
5. Total number of symbols in the pictograph = (3 + 8 + 5 + 9 + 6 + 2) = 33. So, total number of cars parked on all the six days = (33 × 5) = 165.

Exercise 70

1. The following pictograph shows the number of bulbs sold by a shop on each of the days of a certain week.

Number of bulbs sold

One  represents 8 bulbs.

From the pictograph, answer the following questions.

(a) How many more bulbs were sold on Thursday than on Monday?

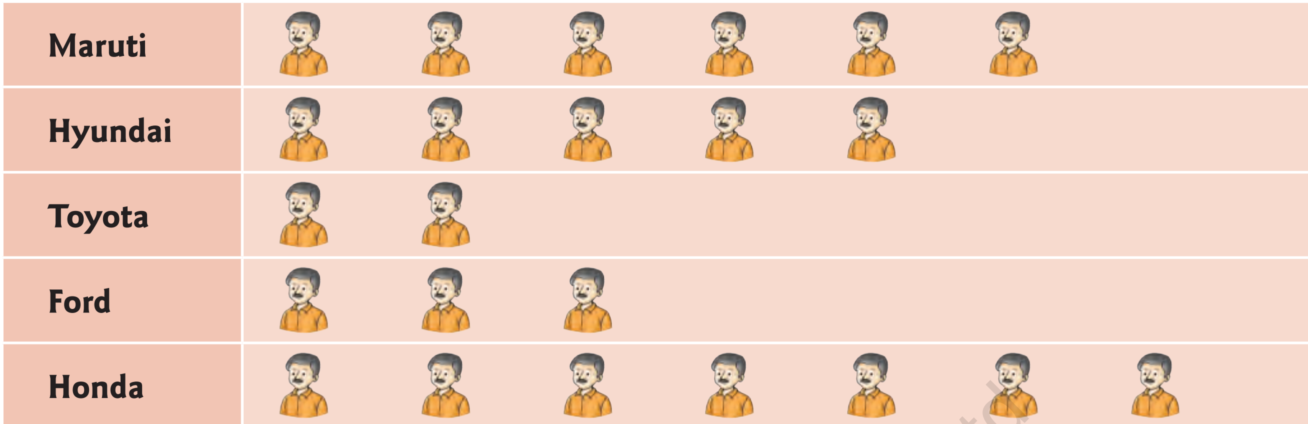
(b) On which day were the maximum number of bulbs sold?

(c) What is the difference between the maximum and minimum number of bulbs sold in a day?

(d) How many bulbs in all were sold by the shop in 6 days?

2. The following pictograph shows the number of staff members, using different brands of cars to travel to office.

Number of staff members using different brands of cars



One  represents 4 staff members.

Carefully, look at the pictograph and answer the following questions.

(a) How many staff members are owners of the Honda brand of cars?

(b) Which is the least popular brand of cars among the staff members?

(c) What is the difference between the number of staff members who own Hyundai brand of cars and those who own Ford brand of cars?

(d) Arrange the given brands of cars in increasing order of their popularity among the staff members.

3. The following pictograph shows the number of different fruit trees in a fruit orchard.

Number of different fruit trees in an orchard

One  represents 150 trees.

From the pictograph, answer the following questions.

(a) What is the total number of fruit trees in the orchard?

(b) How many orange trees are there in the orchard?

(c) How many more apple trees are there than mango trees?

(d) The number of which of the two types of trees together is equal to the number of guava trees in the orchard?

An Introduction to Bar Graphs

The pictograph is a conventional method of representing a given data pictorially. But with changing times, this method grew less popular as it is time-consuming and needed an artistic hand to draw clear and appealing hand-drawings. New and easier methods of presenting data were devised. One such popular method is the bar graph.

Let us take an example.

Consider the following information about the number of absentees on a particular day in various classes of a school.

Class	I	II	III	IV	V	VI
Number of absentees	3	5	2	6	1	3

Let us draw a bar graph to depict this information.

Draw a vertical line OY and a horizontal line OX, meeting at a point O.

Along OX and OY, mark points at equal intervals say 1 cm.

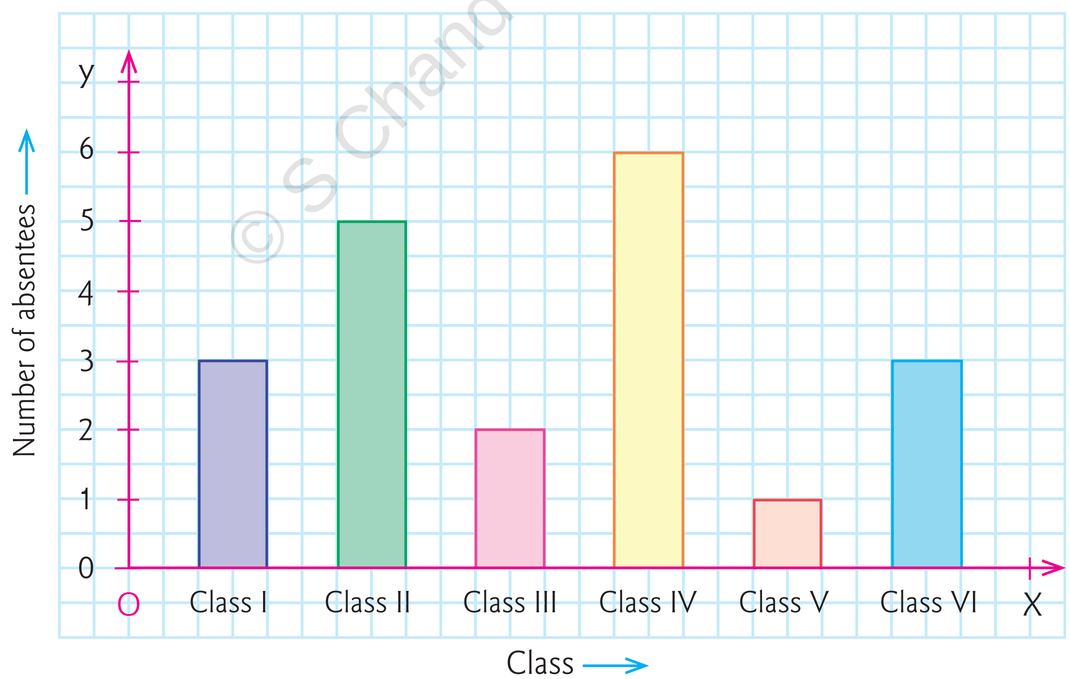
Let 1 cm represent 1 absentee along OY and classes along OX.

Now, from the points taken along OX, draw rectangles of heights 3 cm, 5 cm, 2 cm, 6 cm, 1 cm and 3 cm respectively.

Here, 3 cm represents 3 absentees, 5 cm represents 5 absentees and so on.

Label these rectangles with the class they represent, as shown in the figure.

Shade the rectangles.



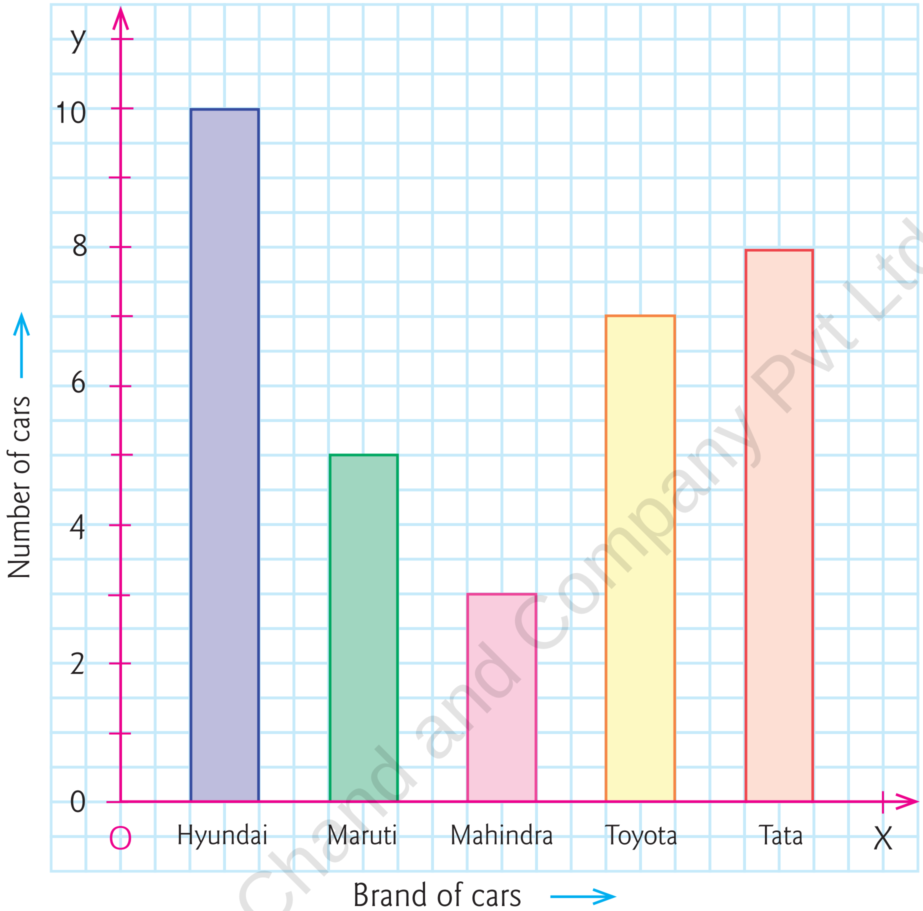
Thus, we draw the bar graph to depict the given information.

Take another example.

Below are given the number of different brands of cars observed in a parking lot on a certain day.

Brand	Hyundai	Maruti	Mahindra	Toyota	Tata
Number of cars	10	5	3	7	8

Proceeding as above and taking 1 cm to represent 2 cars along OY, we get the following bar graph.



Exercise 71

In each of the following questions, represent the given information through a bar graph.

1. Number of different fruits in a fruit basket.

Fruit	Apples	Bananas	Apricots	Oranges
Number	6	4	5	8

2. Number of cheese packets sold at a particular store on various days of a week.

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Number of packets sold	9	3	6	12	6	15

(**Hint:** Take 1 cm to represent 3 packets.)

3. Number of salesmen of a company visiting different cities of India.

City	Delhi	Surat	Chennai	Jaipur	Kolkata
Number of Salesmen	8	2	10	4	6

Activity Time

Ask each of your classmates about his/her favourite hobby/pastime. Prepare a table mentioning the hobby and the number of children following it, as shown below.

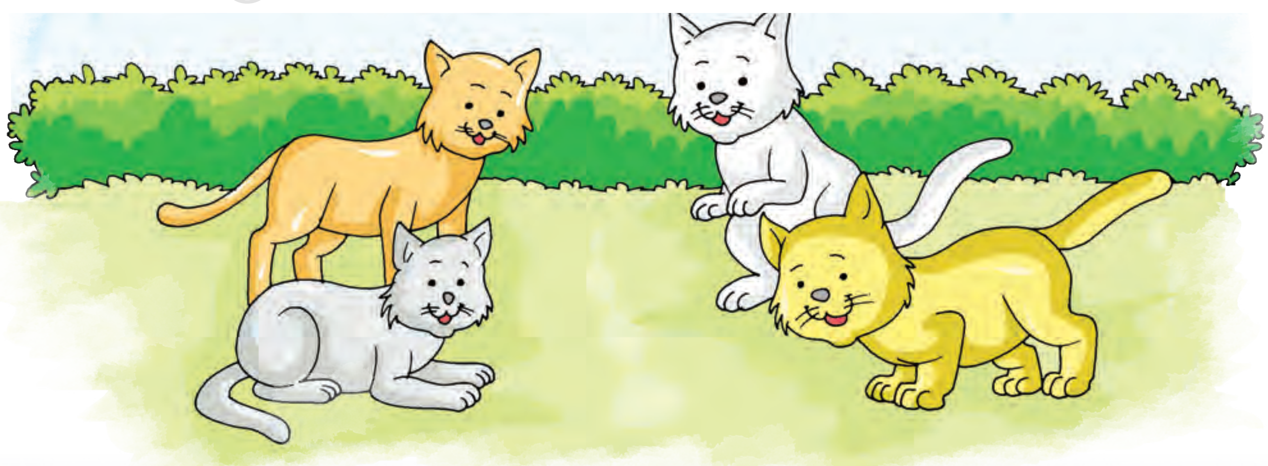
Hobby	Number of students
Reading	
Drawing and Painting	
Collecting stamps	
Craft-making	

Now, prepare a bar graph for the above information, marking hobbies along the horizontal line OX and the number of students along the vertical line OY.

Repeat the above activity by asking your classmates their

(a) favourite food item/dish.

(b) favourite game/sport.



Answers

Exercise 1

1. (a) 9999 (b) 1000 (c) 80 (d) 2999 (e) 6900 (f) 0, at whatever place it may be (g) 9876 (h) 1023

2. (a) Five thousand four hundred seventy-six (b) Three thousand nine hundred forty (c) Nine thousand seven hundred (d) Six thousand nineteen (e) Eight thousand sixty (f) Five thousand eight hundred three (g) Seven thousand one (h) One thousand eleven

3. (a) 8602 (b) 5100 (c) 4070 (d) 9009 (e) 3014 (f) 8880 (g) 1002 (h) 7031 (i) 3030 (j) 6606 (k) 5010 (l) 9500

4.

Digit	8	3	4	7
Face Value	8	3	4	7
Place Value	8000	300	40	7

5. 6930 **6.** 250 **7.** (a) 8000 + 600 + 20 + 9 (b) 9000 + 400 + 70 (c) 5000 + 300 + 9 (d) 6000 + 50 + 4 (e) 7000 + 50 (f) 4000 + 800 + 10 **8.** (a) 4561 (b) 5087 (c) 7707 (d) 9019 (e) 6030 (f) 8005

9. 3037, 3042, 3047, 3052, 3057, 3062, 3067, 3072 **10.** 9023, 9038, 9053, 9068, 9083, 9098, 9113

11. 2010, 1960, 1910, 1860, 1810, 1760, 1710, 1660

12. (a) 44, 51, 58, 65 (b) 225, 240, 255, 270 (c) 1250, 1300, 1350, 1400 (d) 9210, 9250, 9290, 9330 (e) 835, 815, 795, 775

13. (a) > (b) < (c) < (d) > (e) < (f) >

14. (a) 6897, 6978, 7896, 7968, 8967, 9687 (b) 7007, 7070, 7077, 7700, 7707, 7777 (c) 5014, 5041, 5104, 5140, 5401, 5410 (d) 5376, 5637, 5763, 6357, 6375, 6735

15. (a) 4303, 4033, 4003, 3400, 3043, 3004 (b) 5620, 5602, 5260, 5206, 5062, 5026 (c) 8888, 8808, 8800, 8088, 8080, 8008 (d) 5554, 5545, 5455, 5454, 5445, 4555

16. (a) 1568 (b) 2057 **17.** (a) 9732 (b) 8640 **18.** (a) 9692 (b) 8868 (c) 9328 (d) 9045

19. (a) 9067 (b) 7605 (c) 0

20. 7616 **21.** 7250

22. (a) 4417 (b) 2905 (c) 3916 (d) 5708

23. 4556 **24.** 1322 **25.** 2156 **26.** 3118 **27.** 7485

28. (a) 5887 (b) 4425 (c) 2602 (d) 889 (e) 1414 (f) 7411

29. (a) 2870 (b) 4900 (c) 9250 (d) 4000 (e) 8400 (f) 9500

30. (a) 4833 (b) 5968 (c) 7608 (d) 19120 (e) 2701 (f) 6570 (g) 7392 (h) 5880 (i) 8584

31. ₹ 3744 **32.** ₹ 9468 **33.** ₹ 8375

34. (a) Q = 38, R = 2 (b) Q = 429, R = 5 (c) Q = 1101, R = 8 (d) Q = 666, R = 4

35. ₹ 594 **36.** 687, 7

37. (a) $\frac{3}{8}$ (b) $\frac{5}{12}$ (c) $\frac{9}{24}$

39. (a) 5 (b) 7 (c) 6

40. (a) 85 rupees 5 paise (b) 453 rupees 95 paise (c) 50 m 37 cm (d) 21 km 35 m (e) 70 kg 291 g (f) 35 L 40 mL

41. (a) 8 rupees 15 paise (b) ₹ 56.25 (c) 10 m 84 cm (d) 3 km 585 m (e) 1 L 675 mL

42. (a) g (b) kg (c) km (d) m (e) m (f) cm (g) mL (h) L

43. (a) 8:45; 45 minutes past 8; Quarter to 9 (b) 5:15; 15 minutes past 5; Quarter past 5 (c) 2:30; 30 minutes past 2; Half past 2 (d) 6:10; 10 minutes past 6 (e) 2:55, 55 minutes past 2; 5 minutes to 3

44. (a) February (b) July, August (c) April, June, September, November (d) 365, 366 (e) 10

45. (a) True (b) False (c) False (d) True (e) False (f) False (g) False (h) True

46. (a) 8, 6, 12 (b) 8, 6, 12 (c) 0, 3, 2 (d) 1, 2, 1 (e) 0, 1, 0

Exercise 2

1. (a) XLIV (b) XXXVIII (c) XCV (d) LXIX (e) LXXXVII (f) XCII (g) LXVI (h) LIV
(i) LXXXV (j) XCIX

2. (a) 29 (b) 45 (c) 89 (d) 99 (e) 49 (f) 78
(g) 94 (h) 55 (i) 39 (j) 64

3. (a), (b), (c), (e), (i) and (j) **4.** (a) > (b) > (c) < (d) < (e) > (f) <

C.C.E. DRILL 1

QUESTION BAG 1

1. (b) **2.** (c) **3.** (c) **4.** (c) **5.** (a) **6.** (c) **7.** (b) **8.** (b)
9. (a) **10.** (c) **11.** (a)

QUESTION BAG 2

2. (a) > (b) > (c) < (d) < **3.** (a) 7 (b) I, X, C (c) V, L

4. (a) XLII (b) LXIV (c) XC (d) XCVI (e) XLV (f) LXIII

5. (a) X (b) XC (c) LV (d) V (e) XXXVII

Exercise 3

1. (a) 5,020 (b) 23,617 (c) 80,003 (d) 3,16,594 (e) 2,00,105 (f) 6,10,056 (g) 20,03,500 (h) 15,60,034

2. (a) Fifty-three thousand one hundred six (b) Twenty-four thousand six hundred eighty-three (c) Fifty-nine thousand nineteen
(d) Three lakh nineteen thousand five hundred forty-six (e) Two lakh four thousand seventy-one (f) Five lakh five
(g) Thirty lakh thirty-three thousand thirty (h) Forty lakh forty thousand four hundred
(i) Sixty-six lakh sixty-six thousand six hundred sixty-six (j) Sixty-one lakh fifty-two thousand four hundred ninety-six

3. (a) 15,682 (b) 25,009 (c) 60,059 (d) 19,001 (e) 2,56,214 (f) 3,03,015 (g) 4,00,067 (h) 10,00,020
(i) 1,00,001 (j) 12,03,009 (k) 79,50,030 (l) 8,01,007

4. (a) 10,000; Ten thousand (b) 99,999; Ninety-nine thousand nine hundred ninety-nine (c) 1,00,000; One lakh
(d) 9,99,999; Nine lakh ninety-nine thousand nine hundred ninety-nine (e) 10,00,000; Ten lakh
(f) 99,99,999; Ninety-nine lakh ninety-nine thousand nine hundred ninety-nine

5. (a) 364,619 (b) 509,067 (c) 1,679,102 (d) 4,056,098 (e) 5,100,309 (f) 12,317,007

6. (a) Three hundred sixty thousand five hundred twenty (b) Six hundred three thousand ninety-seven
(c) One million four hundred thousand three hundred seventeen (d) Five million fifty-nine thousand eighty-two
(e) Seven million ten thousand eight (f) Ten million three hundred thousand one hundred three

7. (a) 305,682 (b) 500,099 (c) 1,164,200 (d) 2,310,108 (e) 10,909,999 (f) 21,601,006

Exercise 4

1. (a) 90 (b) 3,000 (c) 40,000 (d) 60 (e) 8,00,000 (f) 50,00,000 (g) 5,00,000 (h) 9,00,000

2. (a)

Digit	7	1	2	3	4
Place Value	7	10	200	3000	40000

(b)

Digit	0	5	4	1	6
Place Value	0	50	400	1000	60000

(c)

Digit	4	0	5	3	1	2
Place Value	4	0	500	3000	10000	200000

(d)

Digit	9	2	4	0	6	8	3
Place Value	9	20	400	0	60000	800000	3000000

3. 59,994 **4.** 2,930 **5.** 7,20,000

6. (a) 24,308 = 20,000 + 4,000 + 300 + 8 (b) 1,23,527= 1,00,000 + 20,000 + 3,000 + 500 + 20 + 7 (c) 3,09,057 = 3,00,000 + 9,000 + 50 + 7
(d) 4,29,010 = 4,00,000 + 20,000 + 9,000 + 10 (e) 16,07,503 = 10,00,000 + 6,00,000 + 7,000 + 500 + 3 (f) 80,60,719 = 80,00,000 + 60,000 + 700 + 10 + 9

7. (a) 13,578 (b) 30,784 (c) 50,043 (d) 90,001 (e) 2,04,103 (f) 30,60,500 (g) 5,03,007

8. (a) 13,580 (b) 23,010 (c) 29,100 (d) 35,000 (e) 4,51,400 (f) 28,67,010 (g) 35,60,000 (h) 99,99,300

9. (a) 38,999 (b) 43,699 (c) 69,099 (d) 1,19,999 (e) 4,04,999 (f) 28,60,099 (g) 66,31,699 (h) 68,09,999

10. 10529, 10531, 10533, 10535, 10537, 10539, 10541 **11.** 20499, 20519, 20539, 20559, 20579, 20599, 20619

12. 9999, 10099, 10199, 10299, 10399, 10499, 10599 **13.** 10000, 9995, 9990, 9985, 9980, 9975, 9970, 9965, 9960

14. (a) 7369, 7377, 7385, 7393 (b) 10531, 10541, 10551, 10561 (c) 23679, 23669, 23659, 23649

(d) 19994, 19992, 19990, 19988 (e) 99700, 99600, 99500, 99400

Exercise 5

1. (a) > (b) < (c) < (d) < (e) < (f) < (g) > (h) =

(i) < (j) <

2. (a) 20,002; 20,020; 20,200; 20,220; 22,000; 22,020 (b) 50,055; 50,550; 55,005; 55,055; 55,505 (c) 29,009; 29,190; 29,500; 90,560; 91,080; 92,100

(d) 77,935; 7,48,805; 7,84,885; 8,64,171; 9,05,667 (e) 4,09,806; 40,98,065; 41,09,806; 41,09,860; 41,90,806

3. (a) 2,13,500; 1,60,940; 1,00,013; 27,960; 16,940; 10,039 (b) 3,03,000; 3,01,090; 2,69,090; 31,107; 29,678; 27,809

(c) 77,18,906; 7,81,906; 7,18,960; 7,18,906; 71,890 (d) 55,06,307; 6,90,020; 6,90,002; 5,54,481; 5,45,481

4. (a) 1,01,000 (b) 10,50,000 (c) 11,00,110 **5.** (a) 157 (b) 209 (c) 346

6. (a) 1036 (b) 3457 (c) 2089 **7.** 10357 **8.** (a) 277 (b) 505 (c) 2588 (d) 7079

9. (a) 943 (b) 850 (c) 731 **10.** (a) 8641 (b) 7520

11. (a) 844 (b) 7552 (c) 6610 **12.** 964320

C.C.E. DRILL 2

QUESTION BAG 1

1. (c) **2.** (b) **3.** (a) **4.** (b) **5.** (d) **6.** (b) **7.** (b) **8.** (b)

9. (a) **10.** (c) **11.** (d) **12.** (b) **13.** (c) **14.** (b) **15.** (d)

QUESTION BAG 2

1.

	Numeral	Indian System	International system
(a)	856943	8,56,943	856,943
(b)	688542	6,88,542	688,542
(c)	3033030	30,33,030	3,033,030

2. (a) 98595, 98605, 98615 (b) 39884, 39984, 40084 (c) 100097, 101097, 102097 (d) 195492, 205492, 215492

(e) 72967, 74967, 76967

3. (a) Nine Lakh eighty-four thousand eighty (b) Six hundred thirty-six thousand nine hundred eighty-five

(c) Five million fifty thousand five (d) Eighty-two lakh four thousand forty-four

4. (a) 6,49,217; Six hundred forty-nine thousand two hundred seventeen (b) 89,32,550; Eight million nine hundred thirty-two thousand five hundred fifty

5. 8940000 **6.** 500700

7. (a) Lakhs, 400000, Lakhs (b) Ten lakhs, 6000000, Lakhs (c) Hundred thousands, 800000, Thousands

(d) Thousands, 4000, Thousands (e) Millions, 9000000, Millions (f) Ten thousands, 60000, Thousands

8. (a) 4 (b) 6 (c) 5 (d) 6

9. (a) > (b) > (c) < (d) < (e) > (f) > (g) < (h) <

10. (a) 700000 (b) 96966 (c) 2 (d) 136489 (e) 6060606 (f) 999999 (g) 100001 (h) 9999998

(i) 100000

11. (a) False (b) True (c) False (d) True

12. (a) 2351684; 2356184; 2356841; 2365841; 2536841 (b) 9009090; 9009099; 9009999; 9090999; 9909090

13. (a) 3876942; 3867429; 3842679; 3824976; 3824679 (b) 8972630; 8792630; 8792360; 8729630; 8729360

14. (a) = (b) = (c) = **15.** 98765

16. (a) 20459 (b) 95420 (c) 24509 (d) 20495 (e) 90542 (f) 95042

17. 987605 **18.** 21034

19. (a) ones (b) 1000 (c) 3 (d) six (e) Ones (f) Ten thousands

20. Greatest → 99982, Smallest → 22289

Exercise 6

1. 57679 **2.** 697869 **3.** 878698 **4.** 889978 **5.** 89987 **6.** 57799 **7.** 979997 **8.** 788999

9. 188889 **10.** 268999 **11.** 138969 **12.** 269999 **13.** 368999

Exercise 7

1. 91112 **2.** 97743 **3.** 814562 **4.** 134001 **5.** 138204 **6.** 1123135 **7.** 103287 **8.** 1093322

9. 350760 **10.** 525292 **11.** 1657430 **12.** 1764318 **13.** 150032 **14.** 73724 **15.** 91369 **16.** 493776

17. 526790 **18.** 637884 **19.** 2099998

20. (a) 12756 (b) 85620 (c) 147840

21. (a)

	6	9	$\boxed{3}$	5
	$\boxed{2}$	4	6	9
+		2	4	7
	9	**6**	**5**	$\boxed{\mathbf{1}}$

(b)

	3	2	7	$\boxed{2}$	9
	1	3	4	2	3
+	2	$\boxed{5}$	1	4	5
	7	**1**	$\boxed{\mathbf{2}}$	**9**	$\boxed{\mathbf{7}}$

Exercise 8

1. 19632 **2.** 43594 **3.** 11059 **4.** 27000 **5.** 29113 **6.** 0 **7.** 23775 **8.** 51684

Exercise 9

1. ₹ 124240 **2.** 103771 **3.** 266200 **4.** ₹ 213210 **5.** 179952 **6.** 130808 **7.** 76446

8. ₹ 206287, ₹ 373776 **9.** 186785, 335581 **10.** 53124, 98248

Exercise 10

1. 43413 **2.** 50534 **3.** 264710 **4.** 422805 **5.** 34331 **6.** 53063 **7.** 52240 **8.** 13211

9. 16454 **10.** 50022 **11.** 31301 **12.** 24102 **13.** 50222 **14.** 20112 **15.** 21111 **16.** 12133

17.

	9	5	8	7	6	7
+	$\boxed{7}$	$\boxed{2}$	4	$\boxed{3}$	0	5
	2	**3**	$\boxed{\mathbf{4}}$	**4**	$\boxed{\mathbf{6}}$	$\boxed{\mathbf{2}}$

18.

	8	6	0	5	4	7
–	2	$\boxed{3}$	$\boxed{0}$	2	$\boxed{2}$	3
	$\boxed{\mathbf{6}}$	**3**	**0**	$\boxed{\mathbf{3}}$	**2**	$\boxed{\mathbf{4}}$

Exercise 11

1. 21627 **2.** 16099 **3.** 49724 **4.** 37639 **5.** 85447 **6.** 188883 **7.** 84039 **8.** 222218

9. 32123 **10.** 11736 **11.** 11674 **12.** 130439 **13.** 12489 **14.** 18849 **15.** 6575 **16.** 53858

17. 7778 **18.** 6556 **19.** 12544 **20.** 3334 **21.** 13399 **22.** 158889 **23.** 8686 **24.** 39376

25. (a) 34000 (b) 600 (c) 1781000 (d) 24000

26. 13103 **27.** 62346 **28.** 12223

Exercise 12

1. 28788 **2.** 133319 **3.** 189865 **4.** 83684 **5.** 40678 **6.** 36727 **7.** 31647 **8.** 33387

9. 12001m **10.** ₹ 252875 **11.** ₹ 82345 **12.** 22224 litres

C.C.E. DRILL 3

QUESTION BAG 1

1. (c) **2.** (a) **3.** (c) **4.** (a) **5.** (b) **6.** (d) **7.** (a) **8.** (d)

9. (a) **10.** (a) **11.** (d) **12.** (c) **13.** (b) **14.** (a) **15.** (b) **16.** (c)

QUESTION BAG 2

1. (a) = (b) > (c) > (d) < (e) =

2. (a) 7 (b) 15 (c) 125 (d) 18

3. (a) 17650 (b) 10927

4. 11689 **5.** 21636 **6.** 49553 **7.** 39334 **8.** 1099998

9. (a) 1955 (b) 90000 (c) 34168, 46793 (d) addends, sum (e) 8600 (f) 10600 (g) 2014
(h) 1000000 (i) 0

10. (a) 60499 (b) 8778 (c) 31000 (d) 700 (e) 650 (f) 10001 (g) 16867 (h) 21234

11. (a) 1522 (b) 500 (c) 14 (d) 11 (e) 62371 (f) 60

12. (a)

	4	9	6	7	8
+	3	2	5	0	9
	8	**2**	**1**	**8**	**7**

(b)

	2	6	7	3	2
+	4	1	2	7	4
	6	**8**	**0**	**0**	**6**

13. (a)

	6	4	4	6
−	4	2	8	7
	2	**1**	**5**	**9**

(b)

	3	4	5	6	7
−		2	0	8	9
	3	**2**	**4**	**7**	**8**

14. (a) False (b) False (c) True (d) False (e) False

15. 111161 **16.** 56241 **17.** ₹ 115892 **18.** 8435

Exercise 13

1. (a) 1 (b) 264 (c) 0 (d) 0 (e) 809 (f) 0

2. (a) 97 (b) 243 (c) 640 (d) 637

3. (a) 76 (b) 138 (c) 83

4. (a) 36 (b) 81 (c) 47 (d) 53

5. (a) 2470 (b) 10560 (c) 39780 (d) 9300 (e) 57600 (f) 291700 (g) 68000
(h) 231000 (i) 1508000

6. 2850 **7.** 8900 **8.** 7630 **9.** 24500 **10.** 15400 **11.** 65200 **12.** 409500 **13.** 1472100

14. 915600 **15.** 178000 **16.** 381000 **17.** 3656000 **18.** 3135000 **19.** 360 **20.** 7900 **21.** 6800

22. 4700 **23.** 18000 **24.** 107000

Exercise 14

1. 37062 **2.** 187395 **3.** 203472 **4.** 30375 **5.** 107715 **6.** 211302 **7.** 299592 **8.** 489528

9. 698984 **10.** 540858 **11.** 688045 **12.** 685990 **13.** 1300622 **14.** 1507896 **15.** 1153866 **16.** 503880

17. 1228962 **18.** 1345542 **19.** 880974 **20.** 295650 **21.** 583110

22. (a)

			4	5	8
×				7	6
		2	7	4	8
	3	2	0	6	0
	3	**4**	**8**	**0**	**8**

(b)

			8	3	6
×				4	6
		5	0	1	6
	3	3	4	4	0
	3	**8**	**4**	**5**	**6**

Exercise 15

1. 8526 **2.** 17236 **3.** 38709 **4.** 143424 **5.** 180000 **6.** 78720 **7.** ₹ 257193 **8.** ₹ 816912
9. ₹ 722115 **10.** ₹ 109604 **11.** 996744

Exercise 16

1. Q = 456, R = 7 **2.** Q = 312, R = 15 **3.** Q = 490, R = 9 **4.** Q = 357, R = 13
5. Q = 251, R = 8 **6.** Q = 185, R = 23 **7.** Q = 205, R = 5 **8.** Q = 219, R = 22
9. Q = 340, R = 11 **10.** Q = 106, R = 15 **11.** Q = 102, R = 16 **12.** Q = 120, R = 23
13. Q = 135, R = 10 **14.** Q = 407, R = 8 **15.** Q = 324, R = 8 **16.** Q = 1006, R = 68
17. Q = 1098, R = 11 **18.** Q = 3000, R = 25 **19.** 110 **20.** 120
21. 3690 **22.** 9010

Exercise 17

1. Q = 52, R = 7 **2.** Q = 162, R = 4 **3.** Q = 100, R = 6 **4.** Q = 6, R = 48
5. Q = 19, R = 36 **6.** Q = 270, R = 7 **7.** Q = 325, R = 5 **8.** Q = 6, R = 947
9. Q = 17, R = 65 **10.** Q = 89, R = 9 **11.** Q = 0, R = 683 **12.** Q = 136, R = 19

Exercise 18

1. 378 **2.** 264 **3.** 245 **4.** 31 **5.** 452 **6.** 372 km **7.** ₹ 167 **8.** 108
9. 35, 4 **10.** 101, 44 **11.** 109 **12.** 54

C.C.E. DRILL 4

QUESTION BAG 1

1. (b) **2.** (d) **3.** (a) **4.** (b) **5.** (b) **6.** (a) **7.** (b) **8.** (d)
9. (d) **10.** (c) **11.** (b) **12.** (c) **13.** (c) **14.** (b) **15.** (c) **16.** (d)
17. (a) **18.** (b) **19.** (d) **20.** (d) **21.** (b)

QUESTION BAG 2

1. (a) Product (b) sharing (c) addition, subtraction (d) remainder (e) 983, 983 (f) 0, 0 (g) 0
(h) 1 (i) dividend (j) 400000 (k) 1 (l) dividend, divisor (m) 1, 2, 3
2. (a) True (b) False (c) True (d) False (e) True (f) False
3. (a) 70 (b) 112 (c) 72 (d) 108 (e) 38 (f) 45 (g) 78 (h) 136
(i) 100
4. (a) 643312 (b) 1859165 (c) 2892703
5. (a) 8400 (b) 300000 (c) 6000 (d) 930000 (e) 856000 (f) 6060000 (g) 100 (h) 1000
6. (a) 4410 (b) 1500 (c) 49200 (d) 3360 (e) 45450 (f) 29970 (g) 28800 (h) 26400
(i) 62400 (j) 15540
7. (a) Q = 394, R = 10 (b) Q = 1491, R = 18 (c) Q = 701, R = 64
8. 16 **9.** ₹ 24365 **10.** 43200 **11.** 989901

12. (a) 2 (b) 20 (c) 200 (d) 2000 (e) 3000 (f) 300 (g) 30 (h) 3

13. (a) Q = 84, R = 96 (b) Q = 98, R = 4 (c) D = 100, R = 56 (d) D = 1000, R = 702

14. ₹ 4827 **15.** 1260 **16.** Q = 344, R = 24

Exercise 19

1. (a) Yes (b) Yes (c) No (d) No (e) Yes (f) No

2. (a) 1, 2, 3, 6, 7, 14, 21, 42 (b) 1, 2, 4, 7, 8, 14, 28, 56 (c) 1, 2, 4, 8, 16, 32, 64

(d) 1, 2, 3, 4, 6, 8, 9, 12, 18, 24, 36, 72

3. (a) 1, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 96 (b) 1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54, 108 (c) 1, 2, 4, 8, 17, 34, 68, 136

4. Yes **5.** No **12.** Smallest →1, Largest → 21

13. (a) 4 (b) 8 (c) 9 (d) 14 (e) 8 (f) 1

Exercise 20

1. (a) Yes (b) Yes (c) No (d) No (e) Yes (f) No (g) Yes (h) Yes

2. 9, 18, 27, 36, 45, 54, 63, 72, 81, 90 **3.** 16, 32, 48, 64, 80, 96, 112, 128, 144 **4.** 23, 46, 69, 92, 115, 138, 161 **5.** No

9. (a) 12 (b) 10 (c) 24 (d) 18 (e) 12 (f) 60

Exercise 21

1. (a) 2 (b) 1 (c) 3 (d) 4 (e) 9 (f) composite

2. 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37 **3.** 41, 43, 47, 53, 59, 61, 67, 71, 73, 79 **4.** 83, 89, 97 **5.** 42, 44, 45, 46, 48, 49, 50, 51, 52, 54, 55, 56, 57, 58

Exercise 22

1. $2 \times 2 \times 2 \times 2 \times 3$ **2.** $3 \times 3 \times 7$ **3.** $2 \times 3 \times 13$ **4.** $2 \times 2 \times 2 \times 7$ **5.** $2 \times 3 \times 3 \times 5$ **6.** $2 \times 2 \times 23$ **7.** $2 \times 2 \times 2 \times 2 \times 2 \times 3$ **8.** $3 \times 5 \times 7$

Exercise 23

1. (a) Yes (b) No (c) Yes (d) Yes (e) No (f) Yes (g) No (h) Yes

2. (a) Yes (b) No (c) Yes (d) Yes (e) No (f) No (g) Yes (h) Yes

3. (a) Yes (b) Yes (c) No (d) Yes (e) No (f) No (g) Yes (h) Yes

4. (a) Yes (b) No (c) Yes (d) No (e) No (f) Yes (g) No (h) Yes

5. (a) Yes (b) No (c) No (d) Yes (e) Yes (f) No (g) Yes (h) No

6. (a) Yes (b) No (c) Yes (d) No (e) No (f) No (g) Yes (h) Yes

7. (a) Odd (b) Even (c) Even (d) Even (e) Even (f) Odd (g) Odd (h) Even

C.C.E. DRILL 5

QUESTION BAG 1

1. (c) **2.** (d) **3.** (a) **4.** (b) **5.** (d) **6.** (b) **7.** (d) **8.** (c)

9. (c) **10.** (d) **11.** (b) **12.** (b) **13.** (d) **14.** (d) **15.** (d)

QUESTION BAG 2

1. (a) 4 (b) 1 (c) 97 (d) 3 (e) 4 (f) 2 (g) greatest, least (h) 56, 64

(i) multiple (j) 2, 3 (k) limited, unlimited (l) 9 (m) 1

2. (a) False (b) False (c) False (d) False (e) True (f) True (g) True (h) False

(i) False (j) True (k) False (l) True (m) True

3. (a) 1, 2, 3, 6, 9, 18, 27, 54 (b) 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84 (c) 1, 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 36, 48, 72, 144

(d) 1, 2, 4, 7, 14, 28, 49, 98, 196

4. (a) 12, 18, 24 (b) 21, 35, 49

5. (a) Yes (b) Yes (c) Yes (d) Yes (e) No (f) No

6. (a) 15, 30 (b) 30, 60 (c) 20, 40 (d) 18, 36

7. (a) 1, 5 (b) 1, 2, 7, 14 (c) 1, 3, 9 (d) 1, 7 (e) 1, 2, 3, 6

8. (a) 3 (b) 5 (c) 6 (d) 4 (e) 15 (f) 27

9. (a) 15 (b) 30 (c) 30 (d) 48 (e) 36 (f) 24

10. (a) 7, 17, 37, 47, 67, 97 (b) 19, 29, 59, 79, 89

11. (a) 21, 51, 81, 91 (b) 33, 63, 93

12. (a) 0, 2, 4, 6, 8 (b) 0, 5 (c) 0

13. 36, 52, 88, 876, 1394 **14.** 78, 468, 888, 1671 **15.** 351, 2052, 3735

Exercise 24

1. (a) 28, 33, 38; Rule : Add 5 to each term to get the next term.

(b) 64, 32, 16; Rule: Divide each term by 2 to get the next term.

(c) 21, 26, 32; Rule : Add 1, 2, 3, 4, 5, 6 to first, second, third, fourth, fifth and sixth terms respectively to get the next term.

(d) 12, 14, 16; Rule : Add 2 to each term to get the next term.

(e) 25, 36, 49; Rule : Add 3, 5, 7, 9, 11, 13 to first, second, third, fourth, fifth and sixth terms respectively to get the next term.

(f) 54, 43, 32; Rule : Subtract 11 from each term to get the next term.

(g) 96, 192, 384; Rule : Multiply each term by 2 to get the next term.

(h) 240, 1440, 10080; Rule : Multiply first, second, third, fourth, fifth, sixth terms by 2, 3, 4, 5, 6, 7 respectively to get the next term.

2. (a) 80 (b) 30 (c) 42 (d) 14 (e) 30 (f) 99

Exercise 25

1. (a) 70 (b) 70 (c) 290 (d) 410 (e) 860 (f) 1040 (g) 3430 (h) 4520 (i) 12650 (j) 30610

2. (a) 300 (b) 900 (c) 500 (d) 1300 (e) 5200 (f) 6300 (g) 9800 (h) 8400 (i) 14600 (j) 26800

3. (a) 4000 (b) 8000 (c) 10000 (d) 16000 (e) 26000 (f) 21000 (g) 31000 (h) 49000

Exercise 26

1. (a) 100, 95 (b) 110, 106 (c) 110, 113 (d) 100, 97 (e) 160, 153 (f) 140, 140 (g) 630, 625 (h) 740, 743

2. (a) 900, 904 (b) 800, 792 (c) 8600, 8565 (d) 6500, 6540 (e) 80500, 80507 (f) 39500, 39462

3. (a) 76000, 76668 (b) 90000, 90193 (c) 91000, 90909

4. 120 **5.** No **6.** ₹ 1000 **7.** Yes

Exercise 27

1. (a) 30, 35 (b) 40, 47 (c) 60, 59 (d) 260, 261 (e) 520, 517 (f) 350, 351 (g) 2330, 2329 (h) 6450, 6451

2. (a) 500, 476 (b) 400, 384 (c) 4800, 4729 (d) 2600, 2587 (e) 43700, 43696 (f) 16700, 16742

3. (a) 11000, 10894 (b) 10000, 9610 (c) 7000, 6539

Exercise 28

1. (a) 1500 (b) 3200 (c) 2500 (d) 3600

2. (a) 40000 (b) 30000 (c) 120000 (d) 90000

3. (a) 20000 (b) 160000 (c) 30000

C.C.E. DRILL 6

1. (a) 9100 (b) 6100 (c) 2500 (d) 4000 (e) 30000 (f) 100000

2. (a) 615, 616, 617, 618, 619, 621, 622, 623, 624 (b) 845, 846, 847, 848, 849, 851, 852, 853, 854

(c) 185, 186, 187, 188, 189, 191, 192, 193, 194 (d) 1235, 1236, 1237, 1238, 1239, 1241, 1242, 1243, 1244

3. (a) 850 to 899 and 901 to 949 (b) 450 to 499 and 501 to 549

(c) 2250 to 2299 and 2301 to 2349 (d) 14550 to 14599 and 14601 to 14649

4. (a) 6500 to 6999 and 7001 to 7499 (b) 1500 to 1999 and 2001 to 2499 (c) 15500 to 15999 and 16001 to 16499 (d) 99500 to 99999 and 100001 to 100499

5. 768 **6.** (a) 396 (b) 1661 (c) 2043 (d) 925 (e) 777 (f) 4398

4. (a) 6500 to 6999 and 7001 to 7499 (b) 1500 to 1999 and 2001 to 2499 (c) 15500 to 15999 and 16001 to 16499 (d) 99500 to 99999 and 100001 to 100499

5. 768 **6.** (a) 396 (b) 1661 (c) 2043 (d) 925 (e) 777 (f) 4398

Exercise 29

6. (a) $\frac{4}{8}$ (b) $\frac{7}{12}$ (c) $\frac{5}{8}$ (d) $\frac{7}{12}$ (e) $\frac{7}{16}$ (f) $\frac{5}{13}$

7. (a) $\frac{2}{5}$ (b) $\frac{1}{6}$ (c) $\frac{3}{8}$ (d) $\frac{4}{9}$ (e) $\frac{5}{11}$ (f) $\frac{7}{15}$ (g) $\frac{8}{17}$ (h) $\frac{6}{13}$

8. (a) three-sevenths (b) two-elevenths (c) seven-tenths (d) five-sixteenths (e) nine-thirteenths (f) eleven-twentieths

Exercise 30

1. (a) numerator = 2, denominator = 5 (b) numerator = 6, denominator = 7

(c) numerator = 9, denominator = 13 (d) numerator = 8, denominator = 15

(e) numerator = 3, denominator = 10 (f) numerator = 7, denominator = 16

(g) numerator = 9, denominator = 19 (h) numerator = 11, denominator = 17

(i) numerator = 14, denominator = 25 (j) numerator = 19, denominator = 36

2. (a) $\frac{7}{9}$ (b) $\frac{1}{6}$ (c) $\frac{4}{5}$ (d) $\frac{10}{11}$ (e) $\frac{3}{6}$ (f) $\frac{14}{25}$ (g) $\frac{1}{8}$ (h) $\frac{7}{30}$

(I) $\frac{14}{27}$ (j) $\frac{7}{15}$

3. (a) denominator (b) numerator (c) 15 (d) 28 (e) numerator, denominator

Exercise 31

9. $\frac{4}{7}$ **10.** $\frac{5}{8}$ **11.** $\frac{3}{5}$ **12.** $\frac{7}{8}$ **13.** $\frac{5}{6}$ **14.** $\frac{4}{9}$ **15.** $\frac{2}{7}$

Exercise 32

1. (a) $\frac{4}{20}, \frac{5}{25}, \frac{6}{30}, \frac{7}{35}$ (b) $\frac{8}{28}, \frac{10}{35}, \frac{12}{42}, \frac{14}{49}$ (c) $\frac{16}{20}, \frac{20}{25}, \frac{24}{30}, \frac{28}{35}$

2. (a) $\frac{2}{8}, \frac{3}{12}, \frac{4}{16}, \frac{5}{20}$ (b) $\frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \frac{10}{15}$ (c) $\frac{6}{8}, \frac{9}{12}, \frac{12}{16}, \frac{15}{20}$ (d) $\frac{10}{12}, \frac{15}{18}, \frac{20}{24}, \frac{25}{30}$

(e) $\frac{8}{18}, \frac{12}{27}, \frac{16}{36}, \frac{20}{45}$ (f) $\frac{6}{16}, \frac{9}{24}, \frac{12}{32}, \frac{15}{40}$ (g) $\frac{12}{14}, \frac{18}{21}, \frac{24}{28}, \frac{30}{35}$ (h) $\frac{14}{18}, \frac{21}{27}, \frac{28}{36}, \frac{35}{45}$

(i) $\frac{6}{20}, \frac{9}{30}, \frac{12}{40}, \frac{15}{50}$ (j) $\frac{16}{22}, \frac{24}{33}, \frac{32}{44}, \frac{40}{55}$

3. (a) 12 (b) 24 (c) 6 (d) 25 (e) 49 (f) 32 (g) 4 (h) 5

(i) 7

4. (a) 15 (b) 24 (c) 35 (d) 70 (e) 63 (f) 42 (g) 6 (h) 7

(i) 7

5. (a) $\frac{30}{54}$ (b) $\frac{40}{72}$ (c) $\frac{35}{63}$ (d) $\frac{45}{81}$

6. (a) $\frac{2}{3}$ (b) $\frac{6}{9}$ (c) $\frac{8}{12}$ (d) $\frac{12}{18}$

7. (a) $\frac{16}{24}$ (b) $\frac{18}{24}$ (c) $\frac{20}{24}$ (d) $\frac{21}{24}$ (e) $\frac{7}{24}$ (f) $\frac{5}{24}$

8. (a) $\frac{18}{45}$ (b) $\frac{18}{24}$ (c) $\frac{18}{21}$ (d) $\frac{18}{20}$ (e) $\frac{18}{28}$ (f) $\frac{18}{23}$

9. (a) , (b) , (e) and (f) are pairs of equivalent fractions

Exercise 33

1. > **2.** < **3.** < **4.** > **5.** > **6.** > **7.** < **8.** > **9.** >

10. (a) $\frac{1}{9}, \frac{4}{9}, \frac{5}{9}, \frac{7}{9}$ (b) $\frac{1}{10}, \frac{3}{10}, \frac{6}{10}, \frac{7}{10}$ (c) $\frac{2}{13}, \frac{4}{13}, \frac{8}{13}, \frac{9}{13}, \frac{11}{13}$ (d) $\frac{1}{14}, \frac{5}{14}, \frac{9}{14}, \frac{11}{14}, \frac{13}{14}$

11. (a) $\frac{6}{7}, \frac{4}{7}, \frac{3}{7}, \frac{2}{7}, \frac{1}{7}$ (b) $\frac{8}{11}, \frac{6}{11}, \frac{4}{11}, \frac{2}{11}, \frac{1}{11}$ (c) $\frac{14}{15}, \frac{13}{15}, \frac{11}{15}, \frac{7}{15}, \frac{4}{15}$ (d) $\frac{20}{21}, \frac{17}{21}, \frac{10}{21}, \frac{5}{21}, \frac{2}{21}$

Exercise 34

1. > **2.** < **3.** > **4.** > **5.** > **6.** < **7.** < **8.** > **9.** <

10. (a) $\frac{2}{9}, \frac{2}{7}, \frac{2}{5}, \frac{2}{3}$ (b) $\frac{3}{11}, \frac{3}{9}, \frac{3}{7}, \frac{3}{5}, \frac{3}{4}$ (c) $\frac{5}{11}, \frac{5}{10}, \frac{5}{8}, \frac{5}{7}, \frac{5}{6}$ (d) $\frac{7}{15}, \frac{7}{13}, \frac{7}{11}, \frac{7}{9}, \frac{7}{8}$

11. (a) $\frac{2}{3}, \frac{2}{5}, \frac{2}{9}, \frac{2}{11}$ (b) $\frac{1}{3}, \frac{1}{6}, \frac{1}{9}, \frac{1}{12}$ (c) $\frac{5}{6}, \frac{5}{8}, \frac{5}{9}, \frac{5}{11}, \frac{5}{13}$

(d) $\frac{4}{7}, \frac{4}{9}, \frac{4}{11}, \frac{4}{13}, \frac{4}{15}$ (e) $\frac{9}{10}, \frac{9}{11}, \frac{9}{13}, \frac{9}{15}, \frac{9}{17}$

Exercise 35

1. (a) Yes (b) Yes (c) Yes (d) No (e) No (f) Yes

2. (a) No (b) Yes (c) No (d) Yes

3. (a) $\frac{1}{8}, \frac{3}{8}, \frac{5}{8}$ (b) $\frac{2}{11}, \frac{4}{11}, \frac{6}{11}$ (c) $\frac{5}{14}, \frac{9}{14}, \frac{11}{14}$

Exercise 36

1. $\frac{1}{5}+\frac{3}{5}=\frac{1+3}{5}=\frac{4}{5}$ **2.** $\frac{2}{6}+\frac{3}{6}=\frac{2+3}{6}=\frac{5}{6}$ **3.** $\frac{3}{10}+\frac{4}{10}=\frac{3+4}{10}=\frac{7}{10}$

4. $\frac{2}{9}+\frac{6}{9}=\frac{2+6}{9}=\frac{8}{9}$ **5.** $\frac{2}{11}+\frac{1}{11}+\frac{4}{11}=\frac{2+1+4}{11}=\frac{7}{11}$ **6.** $\frac{4}{6}$

7. $\frac{5}{7}$ **8.** $\frac{7}{8}$ **9.** $\frac{3}{4}$ **10.** $\frac{6}{9}$ **11.** $\frac{7}{10}$ **12.** $\frac{10}{11}$ **13.** $\frac{13}{15}$ **14.** $\frac{15}{20}$

15. $\frac{10}{11}$ **16.** $\frac{14}{16}$ **17.** $\frac{8}{14}$ **18.** $\frac{5}{6}$ **19.** $\frac{9}{11}$ **20.** $\frac{8}{10}$ **21.** $\frac{10}{12}$

Exercise 37

1. $\frac{4}{8}$ **2.** $\frac{4}{6}$ **3.** $\frac{1}{7}$ **4.** $\frac{3}{9}$ **5.** $\frac{2}{7}$ **6.** $\frac{2}{10}$ **7.** $\frac{7}{15}$ **8.** $\frac{4}{17}$

9. $\frac{6}{20}$ **10.** $\frac{2}{5}$ **11.** $\frac{4}{7}$ **12.** $\frac{4}{8}$ **13.** $\frac{5}{13}$ **14.** $\frac{3}{10}$ **15.** $\frac{2}{7}$ **16.** $\frac{3}{11}$

Exercise 38

1. (a) $\frac{8}{4}$ (b) $\frac{30}{5}$ (c) $\frac{48}{8}$ (d) $\frac{27}{9}$ (e) $\frac{66}{11}$ (f) $\frac{72}{24}$ (g) $\frac{96}{16}$ (h) $\frac{100}{50}$

2. (a) $2 \div 7$ (b) $5 \div 9$ (c) $13 \div 17$ (d) $80 \div 25$ (e) $36 \div 67$ (f) $42 \div 83$ (g) $9 \div 16$ (h) $45 \div 128$

3. (a) Yes (b) No (c) No (d) Yes (e) Yes (f) No (g) Yes (h) Yes

4. (a) Yes (b) Yes (c) Yes (d) No (e) Yes (f) Yes (g) Yes (h) No

5. (a) Yes (b) No (c) Yes (d) No (e) Yes (f) No (g) Yes (h) Yes

6. No, $\frac{1}{1}$ is a unit improper fraction

7. (a) $\frac{17}{7}$ (b) $\frac{35}{8}$ (c) $\frac{50}{7}$ (d) $\frac{59}{9}$ (e) $\frac{12}{11}$ (f) $\frac{35}{12}$ (g) $\frac{93}{10}$ (h) $\frac{26}{17}$

8. (a) $2\frac{4}{5}$ (b) $2\frac{4}{7}$ (c) $4\frac{3}{6}$ (d) $4\frac{3}{8}$ (e) $11\frac{1}{9}$ (f) $12\frac{3}{4}$ (g) $8\frac{7}{10}$ (h) $9\frac{7}{11}$

C.C.E. DRILL 7

QUESTION BAG 1

1. (c) **2.** (a) **3.** (d) **4.** (c) **5.** (c) **6.** (b) **7.** (c) **8.** (d)

9. (d) **10.** (b) **11.** (d) **12.** (a) **13.** (a) **14.** (b) **15.** (c)

QUESTION BAG 2

1. (a) unlike (b) numerator, denominator (c) proper (d) proper (e) improper

(f) 4 (g) improper (h) unit, proper (i) 1 (j) $\frac{2}{5}$ (k) division

2. (a) $\frac{2}{12}, \frac{3}{18}, \frac{4}{24}, \frac{5}{30}, \frac{6}{36}$ (b) $\frac{8}{10}, \frac{12}{15}, \frac{16}{20}, \frac{20}{25}, \frac{24}{30}$ (c) $\frac{10}{14}, \frac{15}{21}, \frac{20}{28}, \frac{25}{35}, \frac{30}{42}$

3. (a) $\frac{4}{9}$ (b) $\frac{15}{36}$

4. (a) 21 (b) 69 (c) 49 (d) 244

5. (a) $\frac{3}{4}=\frac{15}{20}=\frac{21}{28}=\frac{24}{32}=\frac{45}{60}$ (b) $\frac{6}{7}=\frac{18}{21}=\frac{30}{35}=\frac{42}{49}=\frac{24}{28}$

6. (a) $\frac{3}{4}$ (b) $\frac{5}{6}$ (c) $\frac{4}{7}$ **7.** $\frac{33}{40}$

8. (a) $<$ (b) $>$ (c) $<$ (d) $<$ (e) $>$ (f) $<$

9. Proper $\rightarrow \frac{2}{7}, \frac{3}{4}, \frac{7}{11}, \frac{9}{17}, \frac{11}{25}$; Improper $\rightarrow \frac{3}{2}, \frac{8}{7}, \frac{13}{6}, \frac{9}{9}$

10. (a) $\frac{1}{7}, \frac{3}{7}, \frac{5}{7}, \frac{6}{7}$ (b) $\frac{2}{8}, \frac{2}{7}, \frac{2}{5}, \frac{2}{3}$ **11.** (a) $\frac{12}{13}, \frac{9}{13}, \frac{7}{13}, \frac{5}{13}$ (b) $\frac{7}{9}, \frac{7}{11}, \frac{7}{14}, \frac{7}{16}$

12. (a) $\frac{13}{23}$ (b) $\frac{13}{19}$ (c) $\frac{5}{13}$ (d) $\frac{5}{17}$

13. (a) 3 (b) 4 (c) 4 (d) 6 (e) $\frac{4}{19}$ (f) $\frac{5}{13}$

14. (a) $2\frac{1}{3}$ (b) $7\frac{5}{7}$ (c) $12\frac{3}{8}$ (d) $14\frac{9}{11}$

15. (a) $\frac{15}{4}$ (b) $\frac{75}{8}$ (c) $\frac{53}{12}$ (d) $\frac{52}{15}$

16. (a) $\frac{7}{4}, 1\frac{3}{4}$ (b) $\frac{4}{3}, 1\frac{1}{3}$ (c) $\frac{5}{2}, 2\frac{1}{2}$ (d) $\frac{11}{6}, 1\frac{5}{6}$ (e) $\frac{12}{5}, 2\frac{2}{5}$

17. (a) $>$ (b) $>$

18. (a) False (b) False (c) False (d) True (e) False (f) False (g) False

(h) False (i) False

19. $\frac{5}{7}$ **20.** $\frac{9}{11}$ **21.** $2\frac{3}{7}$ m

Exercise 39

1. (a) 0.5 (b) 0.04 (c) 0.29 (d) 0.60 (e) 0.743 (f) 0.800 (g) 0.017 (h) 0.003

2. (a) $\frac{6}{10}$ (b) $\frac{2}{100}$ (c) $\frac{16}{100}$ (d) $\frac{9}{1000}$ (e) $\frac{53}{1000}$ (f) $\frac{108}{1000}$ (g) $\frac{754}{1000}$ (h) $\frac{910}{1000}$

3. (a) decimal one (b) decimal zero one (c) one point zero one three (d) twelve point six zero eight (e) one hundred six point three six

(f) thirteen point nine seven (g) six hundred thirteen point eight (h) two hundred seventeen point five zero three

4. (a) 0.29 (b) 0.307 (c) 13.8 (d) 93.147 (e) 118.703 (f) 700.738 (g) 70.043 (h) 909.091

(i) 81.1

5. Five thousandths – 0.005

Five and five tenths – 5.5

Fifty-five hundredths – 0.55

Five hundredths – 0.05

Fifty hundredths – 0.50

6. (a)

Digit	6	7
Place Value	$\frac{6}{10}$	$\frac{7}{100}$

(b)

Digit	5	1	8
Place Value	5	$\frac{1}{10}$	$\frac{8}{100}$

(c)

Digit	6	0	4	3
Place Value	60	0	$\frac{4}{10}$	$\frac{3}{100}$

(d)

Digit	2	9	3	5	4
Place Value	20	9	$\frac{3}{10}$	$\frac{5}{100}$	$\frac{4}{1000}$

(e)

Digit	1	0	3	2	4
Place Value	100	0	3	$\frac{2}{10}$	$\frac{4}{100}$

(f)

Digit	1	4	5	0	6
Place Value	10	4	$\frac{5}{10}$	0	$\frac{6}{1000}$

(g)

Digit	6	9	5
Place Value	$\frac{6}{10}$	$\frac{9}{100}$	$\frac{5}{1000}$

(h)

Digit	5	3	6	0	0	8
Place Value	500	30	6	0	0	$\frac{8}{1000}$

7. (a) $83.74 = 80 + 3 + \frac{7}{10} + \frac{4}{100}$ (b) $25.06 = 20 + 5 + \frac{6}{100}$ (c) $13.245 = 10 + 3 + \frac{2}{10} + \frac{4}{100} + \frac{5}{1000}$

(d) $73.009 = 70 + 3 + \frac{9}{1000}$ (e) $49.068 = 40 + 9 + \frac{6}{100} + \frac{8}{1000}$ (f) $501.04 = 500 + 1 + \frac{4}{100}$

(g) $158.091 = 100 + 50 + 8 + \frac{9}{100} + \frac{1}{1000}$ (h) $765.149 = 700 + 60 + 5 + \frac{1}{10} + \frac{4}{100} + \frac{9}{1000}$

8. (a) $\frac{6}{10}$ (b) $\frac{6}{1000}$ (c) $\frac{6}{100}$ (d) $\frac{6}{10}$ (e) $\frac{6}{1000}$ (f) 60

9. (a) 1000 (b) 1000 (c) 100 (d) 100, 1000 (e) 6, 10, 100, 1000 (f) 100, 1000

10. (a) 8.273 (b) 76.325 (c) 635.704 (d) 16.002 (e) 9.01 (f) 206.059 (g) 71.008 (h) 40.203

C.C.E. DRILL 8

QUESTION BAG 1

1. (b) **2.** (b) **3.** (c) **4.** (a) **5.** (c) **6.** (b) **7.** (d) **8.** (b)

9. (a) **10.** (a) **11.** (b) **12.** (a) **13.** (a)

QUESTION BAG 2

1. (a) 83.7 (b) 65.23 (c) 71.09 (d) 29.011 (e) 75.003 (f) 138.213 (g) 0.097 (h) 6.037

2. (a) 0.725 (b) 0.803 (c) 0.049

3. (a) $\frac{3}{10}$, 0.3 (b) $\frac{6}{10}$, 0.6 (c) $\frac{14}{100}$, 0.14 (d) $\frac{25}{100}$, 0.25

4. (a) 8.05 (b) 0.045 (c) 85 (d) 4, 4, 1000 (e) tens, tenths

5. (a) $\frac{5}{100}$ (b) 1 (c) $\frac{6}{10}$ (d) 800 (e) $\frac{9}{1000}$ (f) 0

Exercise 40

1. (a) 83 rupees 45 paise; ₹ 83.45 (b) 17 rupees 90 paise; ₹ 17.90 (c) 106 rupees 15 paise; ₹ 106.15 (d) 200 rupees 8 paise; ₹ 200.08
(e) 1 rupee 64 paise; ₹ 1.64 (f) 11 rupees 5 paise; ₹ 11.05 (g) 4 rupees 4 paise; ₹ 4.04 (h) 65 paise; ₹ 0.65
(i) 6 paise; ₹ 0.06

2. (a) Rupees seventy-six and paise fifty (b) Rupees ninety and paise five (c) Rupees one hundred sixty-five and paise twenty-five
(d) Rupees eighty-four (e) Rupees one thousand eight and paise eighty-five (f) Paise ninety-four
(g) Rupee one and paise eight (h) Paise six

3. (a) 3465 p (b) 10240 p (c) 20005 p (d) 132520 p (e) 909 p (f) 71856 p (g) 50101 p (h) 115 p

4. (a) 1650 p (b) 2305 p (c) 23718 p (d) 809 p (e) 33142 p (f) 103523 p (g) 60614 p (h) 50080 p
(i) 101 p

5. (a) ₹ 31.56 (b) ₹ 104.37 (c) ₹ 85.40 (d) ₹ 4.81 (e) ₹ 10.05 (f) ₹ 3.03 (g) ₹ 0.95 (h) ₹ 0.06
(i) ₹ 0.14 (j) ₹ 161.45 (k) ₹ 50.00 (l) ₹ 12.08

Exercise 41

1. ₹ 792.60 **2.** ₹ 784.45 **3.** ₹ 1723.73 **4.** ₹ 2592.98 **5.** ₹ 6026.95 **6.** ₹ 18504.55 **7.** ₹ 1721.30 **8.** ₹ 5757.05

9. ₹ 72.80 **10.** ₹ 1218.55 **11.** ₹ 626.74 **12.** ₹ 157.75 **13.** ₹ 236.25 **14.** ₹ 374.52 **15.** ₹ 1429.66 **16.** ₹ 1781.55

17. Pencil, ₹ 4.55 **18.** Mona, ₹ 396.25 **19.** ₹ 356.95 **20.** ₹ 259.65

Exercise 42

1. ₹ 126.80 **2.** ₹ 1361.40 **3.** ₹ 1834.40 **4.** ₹ 4321.20 **5.** ₹ 8434.56 **6.** ₹ 66247.95 **7.** ₹ 952.50 **8.** ₹ 4261.44

9. ₹ 14855.20 **10.** ₹ 17972.50 **11.** ₹ 69895 **12.** ₹ 201906

Exercise 43

1. (a) ₹ 8.75 (b) ₹ 37.38 (c) ₹ 40.90 (d) 105.66 **2.** ₹ 8.60 **3.** ₹ 0.85 **4.** ₹ 10.35 **5.** ₹ 122.80

6. ₹ 45.75 **7.** ₹ 325.60

C.C.E. DRILL 9

QUESTION BAG 1

1. (d) **2.** (b) **3.** (d) **4.** (d) **5.** (c) **6.** (d) **7.** (b) **8.** (c)

QUESTION BAG 2

1. (a) < (b) < (c) > (d) > (e) =

2. (a) Correct (b) Wrong; 92580 p = ₹ 925.80 (c) Wrong; 1015 p = ₹ 10.15 (d) Correct

3. ₹ 20.25 **4.** ₹ 159.85 **5.** ₹ 4.50 **6.** ₹ 47.50 **7.** ₹ 174.40 **8.** ₹ 36.75 **9.** ₹ 28.20

10. ₹ 164.60 **11.** ₹ 73.25

Exercise 44

1. (a) 5000 m (b) 18000 m (c) 73000 m (d) 208000 m
2. (a) 80 dm (b) 150 dm (c) 510 dm (d) 3140 dm
3. (a) 900 cm (b) 1700 cm (c) 8400 cm (d) 13500 cm
4. (a) 70 mm (b) 230 mm (c) 650 mm (d) 920 mm

Exercise 45

1. (a) 6416 m (b) 23025 m (c) 80005 m (d) 1001 m (e) 10165 m (f) 100010 m
2. (a) 88 dm (b) 255 dm (c) 1033 dm
3. (a) 540 cm (b) 6375 cm (c) 4005 cm (d) 101 cm
4. (a) 66 mm (b) 248 mm (c) 301 mm (d) 835 mm
5. (a) 4856 m (b) 12685 m (c) 9999 m (d) 1111 m

Exercise 46

1. (a) 7 cm (b) 8 cm 5 mm (c) 6 cm 4 mm (d) 1 cm 4 mm
2. (a) 4 m (b) 9 m (c) 5 m 20 cm (d) 1 m 65 cm (e) 2 m 4 cm (f) 3 m 10 cm (g) 35 m 60 cm
3. (a) 5 km (b) 11 km (c) 3 km 800 m (d) 3 km 206 m (e) 9 km 80 m (f) 7 km 5 m (g) 2 km 15 m
4. 5 m 38 cm
5. (a) 100 (b) 10 (c) 1000 (d) 10 (e) 5 m 23 cm (f) 3 km 486 m

Exercise 47

1. (a) 4000 g (b) 23000 g (c) 108000 g (d) 310000 g
2. (a) 8125 g (b) 12030 g (c) 20005 g (d) 65250 g
3. (a) 7000 mg (b) 63000 mg (c) 400000 mg (d) 865000 mg
4. (a) 5260 mg (b) 14015 mg (c) 125008 mg (d) 1001 mg (e) 10010 mg (f) 100050 mg
5. (a) 3333 g (b) 5423 g (c) 1111 g (d) 20586 g

Exercise 48

1. (a) 2 kg (b) 9 kg (c) 12 kg (d) 8 kg
2. (a) 7 kg 300 g (b) 3 kg 460 g (c) 4 kg 508 g (d) 3 kg 65 g (e) 2 kg 6 g
3. (a) 3 g 805 mg (b) 9 g 468 mg (c) 5 g 550 mg (d) 23 g 960 mg (e) 63 g 63 mg (f) 95 g 10 mg
4. (a) 1 kg 680 g (b) 5 kg 400 g (c) 7 kg 20 g (d) 8 kg 80 g (e) 13 g 440 mg (f) 55 g 55 mg

Exercise 49

1. (a) 8000 L (b) 50000 L (c) 132000 L
2. (a) 2350 L (b) 83060 L (c) 102008 L
3. (a) 5000 mL (b) 16000 mL (c) 85000 mL (d) 163000 mL
4. (a) 6250 mL (b) 15040 mL (c) 106480 mL (d) 34006 mL (e) 3003 mL
5. (a) 3645 L (b) 12869 L (c) 1234 L (d) 9786 L

Exercise 50

1. (a) 4 (b) 8 (c) 11 (d) 5
2. (a) 6 L 800 mL (b) 7 L 250 mL (c) 8 L 675 mL (d) 4 L 80 mL (e) 2 L 6 mL
3. (a) 7 kL (b) 5 kL 600 L (c) 9 kL 870 L (d) 8 kL 80 L (e) 2 kL 5 L (f) 3 kL 130 L
4. (a) 3 L (b) 4 L 260 mL (c) 9 L 675 mL (d) 7 L 70 mL (e) 9 L 5 mL (f) 10 L 10 mL

Exercise 51

1. 22 m 90 cm 2. 25 m 30 cm 3. 82 m 20 cm 4. 54 m 5 cm 5. 12 km 110 m 6. 53 km 340 m 7. 7 m 60 cm
8. 11 m 78 cm 9. 28 km 880 m 10. 15 km 795 m

Exercise 52

1. 39 kg 820 g **2.** 30 kg **3.** 74 kg 330 g **4.** 25 kg 440 g **5.** 27 kg 50 g **6.** 506 g 300 mg **7.** 940 g 840 mg
8. 621 g 140 mg **9.** 7 kg 680 g **10.** 8 kg 95 g **11.** 13 kg 685 g **12.** 4 g 653 mg **13.** 275 kg

Exercise 53

1. 23 L 985 mL **2.** 35 L 250 mL **3.** 61 L **4.** 76 L **5.** 14 L 50 mL **6.** 10 L 150 mL **7.** 5 L 865 mL
8. 7 L 805 mL **9.** 13 L 75 mL **10.** 19 L 845 mL **11.** 2 L 825 mL

Exercise 54

1. 10 km 810 m **2.** 21 L 410 mL **3.** 216 L 450 mL **4.** 16 kg **5.** 107 m 35 cm **6.** 1 L 285 mL **7.** 6 kg 950 g
8. Mr Pande's; 225 g

C.C.E. DRILL 10

QUESTION BAG 1

1. (d) **2.** (a) **3.** (b) **4.** (a) **5.** (c) **6.** (b) **7.** (c) **8.** (b)
9. (b) **10.** (c) **11.** (a) **12.** (c) **13.** (d) **14.** (a)

QUESTION BAG 2

1. (a) 15000 (b) 260 (c) 16000 (d) 81000 (e) 990 (f) 7700 (g) 6800 (h) 500
(i) 18018 (j) 102 (k) 20080 (l) 202 (m) 636
2. (a) 50000 (b) 1300000 (c) 18010 (d) 105200 (e) 40070 (f) 100000 (g) 80080 (h) 250005
3. (a) 65000 (b) 900000 (c) 55005 (d) 80080 (e) 200000 (f) 10010
4. (a) 8 cm 4 mm (b) 7 m 96 cm (c) 3 km 456 m (d) 9 km 90 m (e) 35 m 2 dm (f) 6 kg 66 g (g) 5 g 208 mg (h) 6 L 372 mL
5. (a) 14 kg 11 g 420 mg (b) 83 m 13 cm 5 mm (c) 43 km 153 m 22 cm (d) 18 kL 84 L 350 mL
6. 2 cm 5 mm **7.** 145 km 435 m **8.** 86 m 77 cm **9.** 5 L 890 mL

Exercise 55

1. ₹ 33925 **2.** 2436 **3.** 27648 **4.** 1566 km **5.** ₹ 385, ₹ 3080 **6.** 3160 **7.** 1625 **8.** 1458 km
9. 58750 **10.** 11928 **11.** 1375 **12.** 418 km **13.** ₹ 82875 **14.** ₹ 405

C.C.E. DRILL 11

QUESTION BAG 1

1. (c) **2.** (b) **3.** (c) **4.** (c) **5.** (b) **6.** (b)

QUESTION BAG 2

1. (a) 600, 10800 (b) 26, 650 (c) 396, 19800 **2.** 54 minutes **3.** 2375 **4.** 6552 **5.** ₹ 13300

Exercise 56

1. (a) 12 (b) 11 (c) 10 (d) 10
2. (a) two (b) one (c) no (d) P, Q (e) line segment (f) point
3. (a) 5.2 cm (b) 2.7 cm (c) 3.5 cm

Exercise 57

1. (a), (b), (d), (e), (g) **2.** (b), (c), (e), (g), (h) **3.** (a), (e)
4. (a) two (b) triangle (c) quadrilateral (d) 3, 3 (e) 4, 4 (f) closed figure (g) square, rectangle
(h) opposite (i) vertex
5. (a) True (b) False (c) False (d) False
6. (a) Sides → AB, BC, AC; Vertices → A, B, C (b) Sides → PQ, QR, PR; Vertices → P, Q, R
(c) Sides → AB, BC, CD, AD; Vertices → A, B, C, D (d) Sides → PQ, QR, RS, PS; Vertices → P, Q, R, S

Exercise 58

1. (a) OA, OC, OB, OD, OE, OG (b) AB, CD (c) AC, BD, AB, CD
2. (a) centre (b) equal (c) twice (d) chord (e) circumference
3. (a) False (b) True (c) False (d) False
4. 16 cm
5. 5 cm

C.C.E. DRILL 12

QUESTION BAG 1

1. (b) 2. (c) 3. (d) 4. (d) 5. (b) 6. (c) 7. (d) 8. (c)
9. (d) 10. (c) 11. (b) 12. (d) 13. (b) 14. (c) 15. (c)

QUESTION BAG 2

1. (a) 3 (b) 7 (c) line segment (d) line (e) 10 (f) line segment (g) arc (h) pentagon
(i) diameter (j) closed figure (k) infinite (l) side, vertex (m) radius
2. (a) infinitely many (b) one
3. 8
4. 22
5. (a) True (b) True (c) True (d) False (e) True

Exercise 59

1. (a) 23 cm (b) 27 cm (c) 26 cm (d) 68 cm (e) 86 m
2. (a) 58 cm (b) 144 cm (c) 59 m (d) 19 m 40 cm
3. 86 cm
4. 42 cm
5. (a) 1 m 20 cm (b) 46 cm (c) 94 cm (d) 61 m 60 cm
6. (a) 64 cm (b) 84 cm (c) 112 m (d) 45 m
7. 96 m
8. 680 metres
9. 1760 metres
10. ₹ 3600
11. 18 m
12. 32 m
13. 33 m

C.C.E. DRILL 13

QUESTION BAG 1

1. (d) 2. (b) 3. (d) 4. (a) 5. (c) 6. (b) 7. (d) 8. (d)
9. (b)

QUESTION BAG 2

1. (a) 45 cm (b) 260 m (c) 113 m (d) 30 m (e) 13 cm (f) 123 m
2. (a) 1 m 50 cm (b) 2 m 20 cm (c) 3 m 60 cm (d) 1 m 5 cm
3. (a) 4 cm (b) 6 cm (c) 11 cm
4. 1 km 275 m

Exercise 60

1. (a) 6, 12, 8 (b) 6, 12, 8 (c) 2, 1, 1 (d) 3, 2, 0 (e) 1, 0, 0 (f) 4, 6, 4 (g) 5, 8, 5
2. (c), (e), (f), (h)
4. (B)

C.C.E. DRILL 14

QUESTION BAG 1

1. (d) 2. (a) 3. (d) 4. (b) 5. (a)

QUESTION BAG 2

1. (a) Cylinder, Cone, Sphere (b) Cone (c) Cylinder, Sphere (d) Sphere (e) Square pyramid (f) Cylinder
(g) Triangular pyramid
2. (a) 3 (b) 2 (c) 6
3. (a) True (b) True (c) False (d) False (e) False (f) True
4. (a) rectangular (b) straight (c) circular (d) plane, curved

Exercise 61

1. (a) No (b) Yes (c) Yes (d) No (e) Yes (f) Yes (g) Yes (h) Yes
(i) No

3. (a) No (b) No (c) No (d) No (e) No (f) No

4. (a) 1 (b) 1 (c) 5

5. One line of symmetry → A, B, C, D, E, K, M, T, U, V, W, Y, 3

Two lines of symmetry → H, I, O, X, 8

Asymmetrical → F, G, J, L, N, P, Q, R, S, Z, 1, 2, 4, 5, 6, 7, 9

Exercise 62

1. (a) 8 o'clock (b) 6 o'clock (c) 11 o'clock (d) 7 o'clock (e) 12 o'clock

2. (a) 9:00; 9 o'clock (b) 6:10; 10 minutes past 6 (c) 8:20; 20 minutes past 8
(d) 2:35; 35 minutes past 2 (e) 12:40; 40 minutes past 12 (f) 5:50; 50 minutes past 5
(g) 4:30; Half past 4 (h) 12:15; Quarter past 12 (i) 10:45; 45 minutes past 10
(j) 9:22; 22 minutes past 9 (k) 11:08; 8 minutes past 11 (l) 4:43, 43 minutes past 4

3. (a) 1:40; 40 minutes past 1; 20 minutes to 2 (b) 3:54, 54 minutes past 3; 6 minutes to 4
(c) 6:47; 47 minutes past 6; 13 minutes to 7 (d) 5:36; 36 minutes past 5; 24 minutes to 6
(e) 12:45; 45 minutes past 12; Quarter to 1 (f) 9:57; 57 minutes past 9; 3 minutes to 10

5. (a) 5:00 (b) 7:25 (c) 11:38 (d) 4:15 (e) 9:30 (f) 5:50 (g) 1:37 (h) 6:45

6. (a) 20 (b) 26 (c) 7, 9 (d) 45, 6 (e) 46, 8

Exercise 63

1. (a) 1 a.m. (b) 2:30 p.m. (c) 0:18 a.m. (d) 12:30 p.m. (e) 6:25 p.m. (f) 7:40 a.m. (g) 9:50 p.m.
(h) 1:05 a.m. (i) 0:45 a.m. (j) 12:15 p.m

2. (a) 9:30 a.m. (b) 11:40 p.m. (c) 12:15 p.m. (d) 0:20 a.m. (e) 1:00 p.m. (f) 11:00 a.m. (g) 4:15 a.m.
(h) 11:30 p.m. (i) 11:20 a.m. (j) 12 mid-night (k) 12 noon

3. (a) a.m (b) p.m. (c) a.m. (d) p.m. (e) p.m. (f) a.m.

Exercise 64

1. (a) 25 minutes (b) 30 minutes (c) 45 minutes (d) 45 minutes

2. (a) 15 minutes (b) 45 minutes (c) 35 minutes (d) 45 minutes

3. 25 minutes 4. 40 minutes 5. 55 minutes

6. (a) 4 hours 40 minutes (b) 4 hours 15 minutes (c) 8 hours 44 minutes (d) 18 hours 50 minutes (e) 20 hours 25 minutes

7. 3 hours 45 minutes 8. 1 hour 50 minutes 9. 12:40 p.m. 10. 7:05 p.m.

Exercise 65

1. (a) 96 hours (b) 168 hours (c) 384 hours (d) 480 hours (e) 90 hours (f) 54 hours

2. (a) 480 minutes (b) 720 minutes (c) 1440 minutes (d) 250 minutes (e) 410 minutes (f) 685 minutes (g) 845 minutes
(h) 990 minutes (i) 1220 minutes

3. (a) 960 seconds (b) 1380 seconds (c) 405 seconds (d) 510 seconds (e) 616 seconds (f) 18000 seconds

Exercise 66

1. (a) 0630 hours (b) 1830 hours (c) 0030 hours (d) 1230 hours (e) 0055 hours (f) 1255 hours (g) 0125 hours
(h) 1625 hours (i) 1150 hours (j) 2350 hours (k) 1430 hours (l) 0330 hours

2. (a) 3:32 a.m. (b) 9:20 p.m. (c) 6:30 a.m. (d) 0:35 a.m. (e) 12:50 p.m. (f) 0:30 a.m. (g) 6 : 40 p.m.
(h) 9:05 p.m. (i) 11:36 a.m. (j) 11:28 p.m. (k) 1:55 a.m. (l) 10:45 a.m.

Exercise 67

1. 14 hours 50 minutes 2. 15 hours 10 minutes 3. 18 hours 30 minutes 4. 20 hours 24 minutes

5. 32 minutes 30 seconds 6. 33 minutes 20 seconds 7. 39 minutes 20 seconds 8. 11 hours 57 minutes

9. 14 hours 20 minutes 10 seconds 10. 21 hours 4 minutes 3 seconds 11. 3 hours 47 minutes 12. 4 hours 48 minutes

13. 8 hours 42 minutes 14. 1 minute 28 seconds 15. 8 minutes 30 seconds

C.C.E. DRILL 15

QUESTION BAG 1

1. (b) 2. (b) 3. (c) 4. (d) 5. (d) 6. (d) 7. (d) 8. (b)

9. (b) 10. (c) 11. (b) 12. (d) 13. (b) 14. (d) 15. (a) 16. (a)

QUESTION BAG 2

1. (a) 11 (b) 420 (c) a.m. (d) 2:00 p.m.

2. (a) < (b) > (c) > (d) > (e) > (f) > (g) <

3. (a) 6 hours 35 minutes (b) 4 hours 45 minutes (c) 7 hours 50 minutes

4. (a) 2115 hours (b) 11:48 p.m. (c) 0:20 a.m. (d) 1215 hours (e) 1535 hours (f) 0000 hours (g) 0025 hours (h) 2:50 p.m.

5. (a) 37 hrs 24 min (b) 36 hrs 33 min (c) 53 min 24 sec (d) 14 hrs 14 min 16 sec (e) 7 hrs 36 min (f) 5 min 17 sec (g) 8 hrs 49 min 48 sec (h) 7 hrs 47 min 37 sec

Exercise 68

1. 366 2. 365 3. 1996, 2000, 2104 4. April, June, September, November

5. January, March, May, July, August, October, December

6. (a) 29 (b) 28

7. 10th, 17th, 24th, 31st

8. (a) Sunday (b) Thursday

9. 19 10. 55 11. 78

12. (a) Sunday (b) Friday (c) Thursday (d) Wednesday (e) Monday (f) Saturday

13. 26 days 14. 60 days 15. 55 days 16. 70 days 17. 30th September

C.C.E. DRILL 16

QUESTION BAG 1

1. (a) 2. (d) 3. (a) 4. (c) 5. (b) 6. (c) 7. (b) 8. (a)

9. (b) 10. (d)

QUESTION BAG 2

1. 2010, 1970, 1978, 1902, 1938, 2006

2. (a) 366 (b) 365 (c) 2016 (d) 2020 (e) Sunday (f) Two (g) 4 (h) 10, 100 (i) Monday

3. (a) May 13 (b) September 28 (c) 95 days (d) February 17 (e) April 7

4. (a) 79 (b) 107

5. 25 days 6. 7th September

Exercise 70

1. (a) 24 (b) Wednesday (c) 56 (d) 312

2. (a) 28 (b) Toyota (c) 8 (d) Toyota, Ford, Hyundai, Maruti, Honda

3. (a) 4950 (b) 1200 (c) 300 (d) Apple and Mango