Frank
EMU BOOKS

Teacher's Handbook
Learning Maths 5

- Teaching-learning methods
- Homework tasks
- Answer key

FRANK EDUCATIONAL AIDS

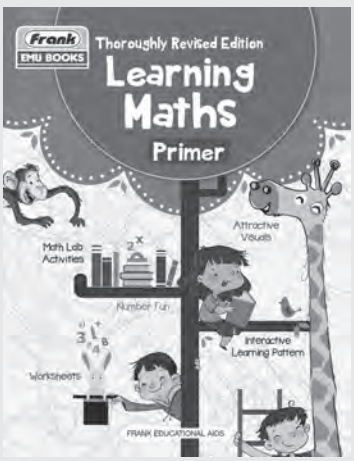
LEARNING MATHS is a series of nine Mathematics textbooks for Classes Introductory to 8. Conforming to the National Curriculum Framework, the series aims to develop thinking and reasoning skills among students by connecting the mathematics curriculum with real-life situations. To make the books user-friendly, mathematical concepts are introduced and explained thoroughly before moving on to essential drill and practice.

Key Features of the Primary Series

The revised edition of Learning Maths for primary classes has been developed to create a passion for the subject among the learners. The key features are:

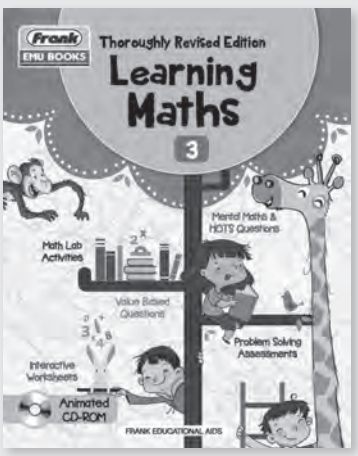
- Graded content with an **INTERACTIVE LEARNING PATTERN** for maximum involvement of children
- Practice Section for additional drilling includes REVISION EXERCISE, SPEEDY MATHS, TRICKY MATHS, MENTAL MATHS, MCQS, MATH LAB ACTIVITY, and much more to meet the curriculum requirement
- **VALUE BASED QUESTIONS** and **PROBLEM SOLVING ASSESSMENT** introduce a variety of real-life situations, and guide students to tackle the problems by strategizing
- **HIGHER ORDER THINKING SKILL (HOTS)** questions include challenges that trigger analytical reasoning
- **WORKSHEETS** at the end of each chapter present fun-filled posers enhance interest in mathematics

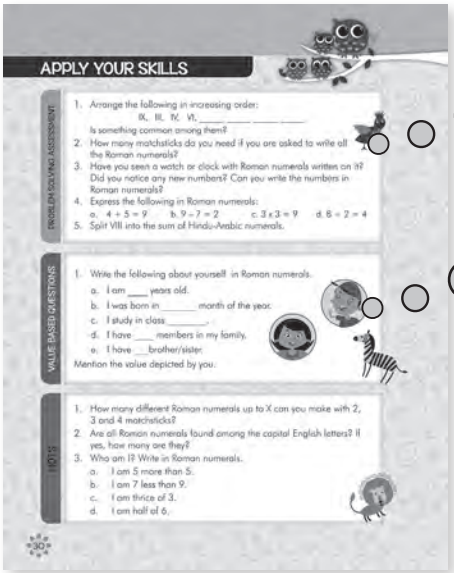
PLUS!



The books are supplemented by

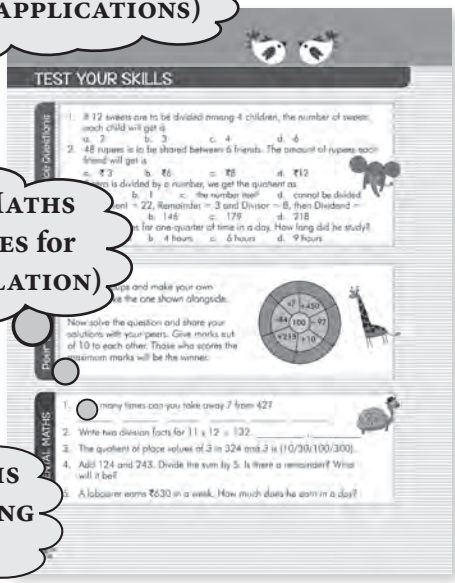
- ENRICHED TEACHER'S MANUAL
- Animated AUDIO-VISUAL CDS to integrate concept–building. They support book content through visuals, animations and interactive exercises.
- We also offer WEB SUPPORT for teachers at *www.frankedu.com*



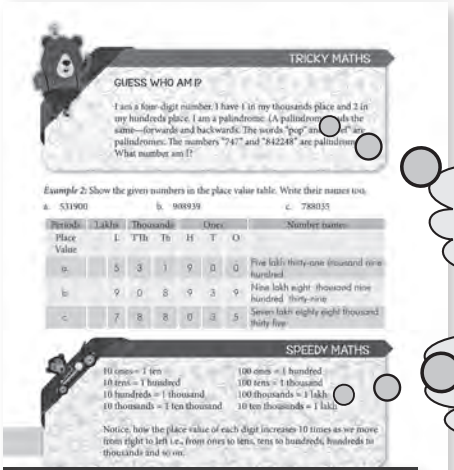


Problem solving Assessment (develop problem solving skills)

Value based Questions (real life applications)



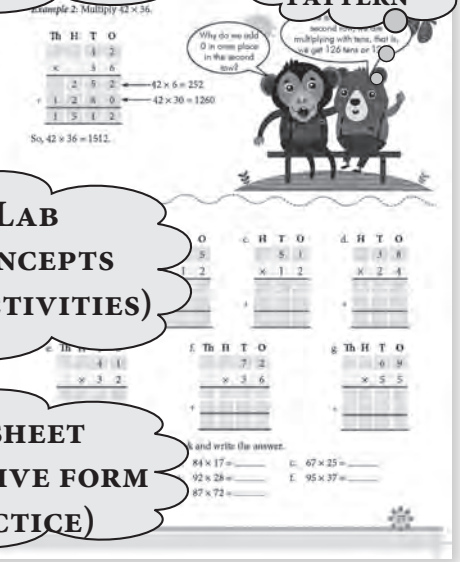
Mental Maths (strategies for fast calculation)

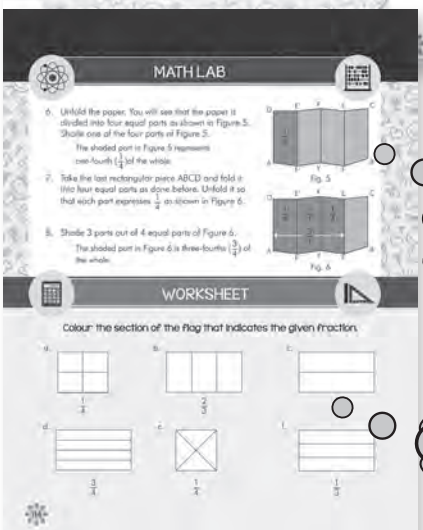


Tricky Maths (build thinking skills)

Speedy Maths (sharpen mathematical skills)

Interactive Learning Pattern





Math Lab (build concepts through activities)

Worksheet (interactive form of practice)

CHAPTER 1

Number and Numeration

Lesson Plan

OBJECTIVES

The students should know about

(i) The smallest and the greatest 5-digit and 6-digit numbers
(ii) System of numeration
(iii) Expanded and short form of the numbers
(iv) Place value system of 7-digit, 8-digit and 9-digit numbers
(v) International place value system
(vi) Comparison of numbers
(vii) Ascending and descending order of numbers

Prerequisite Knowledge: The students should have the basic knowledge of 3-digit, 4-digit, 5-digit and 6-digit numbers as they have studied in their previous classes.

Teaching Aids: Writing board, marker, chalks, charts, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics of this chapter will be taught in the class by giving simple examples.

(i) Revision of 5-digit and 6-digit numbers and their expanded form.

(ii) **System of numeration**

(a) **Indian place value chart**

Period	Lakhs		Thousands		Ones		
Place value	TL	L	TTh	Th	H	T	O
Numbers		100000	10000	1000	100	10	1

(b) **International place value chart**

Period	Thousands			Ones		
Place value	HTh	TTh	Th	H	T	O
Numbers	100000	10000	1000	100	10	1

(iii) **7-digit numbers:**
(a) Smallest 7-digit number = 1000000 (b) Greatest 7-digit number = 9999999

(iv) **8-digit numbers:**
(a) Smallest 8-digit number = 10000000 (b) Greatest 8-digit number = 99999999

(v) **9-digit numbers:**
(a) Smallest 9-digit number = 100000000 (b) Greatest 9-digit number = 999999999

(vi) **Expanded form:**
95475035 = 9 × 10000000 + 5 × 1000000 + 4 × 100000 + 7 × 10000 + 5 × 1000 + 3 × 10 + 5

Recapitulation: The whole chapter will be revised in the class by giving some extra questions and the problems will be solved accordingly.

Price : ₹192.00

Home Assignments

(A) From Textbook

(i) Exercise 1.1—Solve Q. No. 1 to 10 all parts (ii) Exercise 1.3—Solve Q. No. 1 to 5 all parts
(iii) Exercise 1.5—Solve Q. No. 1 to 6 all parts

(B) Extra Questions

(i) Write the expanded form of 8300305.
(ii) Write the following numbers in ascending order.
8356891, 8835691, 8536981, 8981536

Textbook Solutions

Exercise 1.1

1.-10. Refer answers at the end of the book.

11.

	TTh	Th	H	T	O	
Smallest no.	3	0	4	6	8	(0 will not come at the ten thousands place, otherwise
Biggest no.	8	6	4	3	0	it will become a 4-digit number)

12.

	Smallest number						Greatest number					
	L	TTh	Th	H	T	O	L	TTh	Th	H	T	O
a.	3	0	0	0	5	9	9	9	9	5	3	0
b.	1	1	2	2	7	7	7	7	2	2	1	1
c.	1	1	2	4	7	8	8	8	7	4	2	1

13. a. 270 b. 3000 c. 1600

Exercise 1.2

1.-2. Refer answers at the end of the book.

3. a. Greatest 6-digit number = 999999
Greatest 5-digit number = 99999
Total 6-digit numbers = Greatest 6-digit number – Greatest 5-digit number
= 999999 – 99999 = 900000
b-c. Similar working as above.

4. Refer answers at the end of the book.

5. a. 15,77,891; 15,77,892; 15,77,893; …; 15,77,899
b. 2,85,00,205; 2,85,00,206; 2,85,00,207; …; 2,85,00,224
c. 44,44,44,445; 44,44,44,446; 44,44,44,447; …; 44,44,44,453

Exercise 1.3

1.–6. Refer answers at the end of the book.

7. Indian Place Value Chart

	Period →	Crores		Lakhs		Thousands		Ones		
	Place →	TC	C	TL	L	TTh	Th	H	T	O
a.	45322342		4	5	3	2	2	3	4	2
b.	904030300	9	0	4	0	3	0	3	0	0
c.	1675009			1	6	7	5	0	0	9
d.	8745023			8	7	4	5	0	2	3
e.	77045123		7	7	0	4	5	1	2	3
f.	399300456	3	9	9	3	0	0	4	5	6

International Place Value Chart

	Period →	Billions			Millions			Thousands			Ones		
	Place →	HB	TB	B	HM	TM	M	HTTh	TTh	Th	H	T	O
a.	45322342					4	5	3	2	2	3	4	2
b.	904030300				9	0	4	0	3	0	3	0	0
c.	1675009						1	6	7	5	0	0	9
d.	8745023						8	7	4	5	0	2	3
e.	77045123					7	7	0	4	5	1	2	3
f.	399300456				3	9	9	3	0	0	4	5	6

8. Refer answers at the end of the book.

Exercise 1.4

1–4. Refer answers at the end of the book.

5. a. 70000 + 400 = 70400
b. 7000000 + 60000 + 80 = 7060080
c. 0 + 3000 = 3000
d. 700000 + 0 = 700000
e. 50000000 + 600000 = 50600000
f. 90000000 + 400000 = 90400000

6. a. 400000 – 8000 = 392000
b. 500000 – 8000 = 492000
c. 400000000 – 40000000 = 360000000
d. 7000000 – 8000 = 6992000
e. 7000000 – 0 = 7000000
f. 900000000 – 9000000 = 891000000

Exercise 1.5

1.–4. Refer answers at the end of the book.

5. a. 3, 2, 7, 8, 4, 6, 1, 5

To write the greatest 7-digit number, we select 7 digits starting from the greatest. They are 3, 2, 7, 8, 4, 6 and 5. Now place them in such a way that the greatest digit occupies the greatest place, i.e., 8765432 is the greatest seven-digit number.

Similarly, to form smallest seven-digit number, we place smaller 7 digits in such a way that the smallest come at the highest place, i.e., 1234567 is the smallest seven-digit number.

Similarly, for eight digits, the greatest numeral is 87654321 and the smallest numeral is 12345678.

b. 0, 2, 4, 1, 3, 6, 8, 9

Seven greater digits are 9, 8, 6, 4, 3, 2 and 1.

Hence greatest seven-digit number = 9864321 and

Seven smaller digits are 0, 1, 2, 3, 4, 6 and 8.

Hence, smallest seven-digit number = 1023468

Greatest eight-digit number using 0, 2, 4, 1, 3, 6, 8, 9 = 98643210

Smallest eight-digit number = 10234689.

Remember that '0' cannot be placed at crore's place as it will become a seven-digit number.

6.–8. Refer answers at the end of the book.

9. Smallest 8-digit number = 10000000

Greatest number using digits 3, 8, 6, 5, 1, 2, 0 is 8653210.

Difference = 10000000
− 8653210
1346790

Smallest number using digits 3, 8, 6, 5, 1, 2, 0 is 1023568.

Difference = 10000000
− 1023568
8976432

10. Greatest 8-digit number = 99999999
Greatest 7-digit number = − 9999999
Difference = 90000000

Greatest 8-digit number = 99999999
Smallest 7-digit number = − 1000000
Difference = 98999999

Exercise 1.6

1.–8. Refer answers at the end of the book.

Test Your Skills

Multiple Choice Questions

1.–5. Refer answers at the end of the book.

Apply Your Skills

Problem Solving Assessment

1. Refer answers at the end of the book.

2. As $\underline{7}\overset{\frown}{089} \rightarrow 7098$, $\underline{8}\overset{\frown}{079} \rightarrow 8097$. So, $\underline{9}\overset{\frown}{078} \rightarrow 9087$.

3.

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

4. 1, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 31, 41, 51, 61, 71, 81, 91, 100 = 21 times

5. a. Rewrite the numeral with commas after every three digits starting from the right.
15,624,608

b. 7,00,000 ⊟ 700, 000

c. 4 hours (as rounding off to the nearest hour, ignore less than half an hour).

Value Based Questions

1. All cars when rounded off will be near to ₹14,00,000. Since the budget is ₹14,00,000, it should be better to go for car D as it may have some better features than car B.

   Value: Friendship
2. Refer answers at the end of the book.

HOTS

1. Any five numbers out of 250000, 250001, ..., 349999 can be written. (Answers may vary)
2. Refer answers at the end of the book.
3.

TL	L	TTh	Th	H	T	O
1	0	0	0	0	4	6
1	0	0	0	0	6	4
4	0	0	0	0	1	6
4	0	0	0	0	6	1
6	0	0	0	0	1	4

1000046 < 1000064 < 4000016 < 4000061 < 6000014

Mental Maths

1. Refer answers at the end of the book.
2. $35080018 = 3 \times \underline{10000000} + \underline{5} \times 1000000 + 8 \times \underline{10000} + 1 \times \underline{10} + \underline{8} \times 1$
3. 7,80,④8,657 ⧏ 7,80,⑧4,657
4. Yes, since 5:50 is more than 5:30, it can be rounded off to 6:00 am.
5. $52,56,308 \times 10 = 52563080 \simeq 52600000$; No.

CHAPTER 2

Roman Numerals

Lesson Plan

OBJECTIVES

The students should know about
(i) Roman numerals and Hindu-Arabic numerals
(ii) Rules of conversion
(iii) Comparison of numerals

Prerequisite Knowledge: The students should have the basic knowledge of the Roman numerals as they have studied in their previous classes.

Teaching Aids: Writing board, marker, chalk, chart, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics of this chapter will be taught in the class with simple examples.

(i) **Roman Numerals:**	I	V	X	L	C	D	M
Hindu-Arabic Numerals:	1	5	10	50	100	500	1000

(ii) **Rules of Conversion:**

(a) **Example:** Convert 2955 to Roman numerals.

$$2955 = 2000 + 900 + 50 + 5 = \text{MMCMLV}$$

(b) **Example:** Convert MCMXXXI to Hindu-Arabic numerals.

Here, M is 1000, CM is 900, XXX is 30 and I is 1.

$\therefore$ MCMXXXI = 1000 + 900 + 30 + 1 = 1931

Note: To write the numerals equal to or greater than 4000, viniculum is used. E.g.: $\overline{IV}$ = 4000, $\overline{X}$ = 10000, etc.

(iii) **Comparison of Roman Numerals**

Example: Compare XCIII and CIX.

Here XCIII = 93 and CIX = 109 $\Rightarrow$ XCIII < CIX

Recapitulation: The whole chapter will be revised in the class by taking some simple and suitable examples and the problem of the students, if any, will be solved immediately.

Home Assignments

(A) From Textbook

(i) Exercise 2.1—Solve Q. No. 1 to 7 all parts

(ii) Test Your Skills—Solve Q. No. 1 to 5 all parts

(B) Extra Questions

(i) Convert 8352 to Roman numerals.

(ii) Convert MMCXXIV to Hindu-Arabic numerals.

(iii) Compare LXIX and LXXV.

Textbook Solutions

Exercise 2.1

1.–6. Refer answers at the end of the book.

7. a. XXXVIII = 38
XXV = 25
Sum = 63 = LXIII

b. LXXXVI = 86
XI = 11
Sum = 97 = XCVII

c. CX = 110
XC = 90
Difference = 20 = XX

d. XXVII = 27
XXIII = 23
Difference = 4 = IV

e. CC × VI = 200 × 6
= 1200 = MCC

f. LXI × XVII = 61 × 17
= 1037 = MXXXVII

g. CCL ÷ XXV = 250 ÷ 25
= 10 = X

h. MMM ÷ L = 3000 ÷ 50
= 60 = LX

Test Your Skills

Multiple Choice Questions

1.–5. Refer answers at the end of the book.

Apply Your Skills

Problem Solving Assessment

1. Rafiq – LXV Dolly – CLI Satinder – XIV, XVI

a. Largest number = CLI c. Satinder

b. Smallest number = XIV d. Dolly

Value Based Questions

1. Refer answers at the end of the book.

2. I, V, X, IV, IX, VI, XI, XV, XIV, XVI

Total sections = 10, maximum number of saplings = 16

Minimum number of saplings = 1.

Value: Care for environment

HOTS

Refer answers at the end of the book.

Mental Maths

1. 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

LIII, LIX, LXI, LXVII, LXXI, LXXIII, LXXIX, LXXXIII, LXXXIX, XCVII

2. $19 \times 4 + 75 \div 15 - 10 + 29 = 76 + 5 - 10 + 29 = 100 = C$

3. 15th August 1947 = XV/VIII/MCMXLVII

4. 2135, 477, 774, 1389

$\Rightarrow$ 477 < 774 < 1389 < 2135 $\Rightarrow$ CDLXXVII < DCCLXXIV < MCCLXXXIV < MMCXXXV

5. Successor of 1850 = 1851 = MDCCCLI

CHAPTER 3

Addition and Subtraction

Lesson Plan

OBJECTIVES

The students should know about

(i) Addition and subtraction and their properties

(ii) Addition without carryover

(iii) Addition with carryover

(iv) Word problems and their formation

(v) Estimations of addition and subtraction

Prerequisite Knowledge: The students should have the basic knowledge of addition and subtraction of smaller numbers as they have done in their previous classes.

Teaching Aids: Writing board, marker, chalks, charts, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics and subtopics of this chapter will be taught in the class with some extra suitable examples.

(i) **Properties of Addition and Subtraction**

(a) When 0 is added to a number, the sum is the number itself.

$$0 + 4538 = 4538 + 0 = 4538$$

(b) When 1 is added to a number, we get the next number (successor) and if 1 is subtracted from it, we get the previous number (predecessor).

$$4538 + 1 = 4539$$
$$4538 - 1 = 4537$$

(c) When a number is subtracted from itself, we get 0.

$$4568 - 4568 = 0$$

(d) **Commutative property:** If the order of two numbers to be added is changed, the sum remains the same.

$$8523 + 50 = 50 + 8523 = 8573$$

(e) **Associative property:** The sum of any three or more numbers remains the same, if their grouping is changed.

$$354 + (870 + 258) = (354 + 870) + 258$$
$$= 1482$$

(ii) **Addition of 7-digit numbers without carryover**

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

(iii) **Addition of 7-digit numbers with carryover**

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

(iv) Word problems and Estimation of addition to be taught in the class with suitable examples.

Recapitulation: The whole chapter will be revised in the class with extra questions and the problems of the students will be solved accordingly.

Home Assignments

(A) From Textbook

(i) Exercise 3.2—Solve Q. No. 1 and 2 all parts.

(ii) Exercise 3.4—Solve Q. No. 1 to 5 all parts.

(iii) Exercise 3.6—Solve Q. No. 1 and 2 all parts.

(B) Extra Questions

(i) Add: 3584 + 6251 + 3021 using associative property

(ii) Subtract: 86532 from 97658

Textbook Solutions

Exercise 3.1

1.–3. Refer answers at the end of the book.

4. a. Distance from city B to C = 56231 km
Distance from city A to B = – 32182 km
Difference = 24049 km

Thus, the train covers 24049 km more distance to travel from city B to C.

d. No of men = 523421
No. of women = 432692
No. of children = + 221342
1177455

∴ Total population of the city is 1177455.

b & c. Similar working as above.

Exercise 3.2

1. Refer answers at the end of the book.

2. a.
1060408
+ 1227391
2287799

2287799 – Twenty-two lakh eighty-seven thousand seven hundred ninety-nine

b.
3527644
+ 7204166
10731810

10731810 – One crore seven lakh thirty-one thousand eight hundred ten.

c.
25842
741287
+ 4499087
5266216

5266216 – Fifty-two lakh sixty-six thousand two hundred sixteen

d.
1924477
39042
+ 5234659
7198178

7198178 – Seventy-one lakh ninety-eight thousand one hundred seventy-eight

Exercise 3.3

1.–2. Refer answers at the end of the book.

3. a.
24365741
+ 55848511
80214252

80214252 – Eight crore two lakh fourteen thousand two hundred fifty-two

b. Similar working as in (a).

c.
$$\begin{array}{r} 8763566 \\ 2136009 \\ +\ 10177835 \\ \hline 21077410 \end{array}$$

21077410 – Two crore ten lakh seventy-seven thousand four hundred ten

d.
$$\begin{array}{r} 87087771 \\ 01178518 \\ +\ 59900866 \\ \hline 148167155 \end{array}$$

148167155 – Fourteen crore eighty-one lakh sixty-seven thousand one hundred fifty-five

Exercise 3.4

1. a. Production of toys in 2011–2012 = 5369831
Production of toys in 2012–2013 = + 8567842
Total production of toys in 2011–2013 = 13937673

b. Production of toys in 2012–2013 = 8567842
Production of toys in 2013–2014 = + 19678395
Total production of toys in 2012–2014 = 28246237

c. Total production of toys in 2011–2015 = 5369831+8567842+19678395+23698743=57314811

2. Cost of house = ₹5632154
Cost of office = + ₹8362158
Total = ₹13994312
Total money spent by Mohan Lal is ₹13994312.

3. Books sold in 1st week = 42621273
Books sold in 2nd week = + 85321540
Total books sold = 127942813

Total books sold at the end of two weeks is 127942813.

4. Number of copies sold in January = 7456231
Number of copies sold in February = 7714098
Number of copies sold in March = + 27849125
Total copies sold = 43019454
Total copies sold in three months is 43019454.

5. Money allocated in 2013 = ₹38741981
Money allocated in 2014 = ₹33141928
Money allocated in 2015 = + ₹37425627
Total money allocated = ₹109309536
Total money allocated for planting trees is ₹109309536.

6–8. Refer answers at the end of the book.

Exercise 3.5

1. a.

Actual sum	Estimated sum
444	400
214	200
+ 879	+ 900
1537	1500

Difference between the actual sum and estimated sum is 1537 – 1500 = 37.

b. Actual sum Estimated sum

269	300
1792	1800
+ 731	+ 700
2792	2800

Difference between the actual sum and estimated sum is 2800 – 2792 = 8.

c. Actual sum Estimated sum

342	300
879	900
+ 1895	+ 1900
3116	3100

Difference between the actual sum and estimated sum is 3116 – 3100 = 16.

d. Actual sum Estimated sum

343	300
486	500
+ 7284	+ 7300
8113	8100

Difference between the actual sum and estimated sum is 8113 – 8100 = 13.

2. a. Actual sum Estimated sum

4865	5000
1349	1000
+ 7426	+ 7000
13640	13000

Difference between the actual sum and estimated sum is 13640 – 13000 = 640.

b. Actual sum Estimated sum

8462	8000
1491	1000
+ 2942	+ 3000
12895	12000

Difference between the actual sum and estimated sum is 12895 – 12000 = 895.

c. Actual sum Estimated sum

14562	15000
8029	8000
+ 4862	+ 5000
27453	28000

Difference between the actual sum and estimated sum is 28000 – 27453 = 547.

d. Actual sum Estimated sum

34521	35000
16882	17000
+ 31449	+ 31000
82852	83000

Difference between the actual sum and estimated sum is 83000 – 82852 = 148.

3. a. Actual sum Estimated sum

23948	20000
52736	50000
+ 54381	+ 50000
131065	120000

Difference between the actual sum and estimated sum is 131065 – 120000 = 11065.

b. Actual sum Estimated sum

63048	60000
7420	10000
+ 85092	+ 90000
155560	160000

Difference between the actual sum and estimated sum is 160000 – 155560 = 4440.

c. Actual sum Estimated sum

33333	30000
54811	50000
+ 36245	+ 40000
124389	120000

Difference between the actual sum and estimated sum is 124389 – 120000 = 4389.

d. Actual sum Estimated sum

174926	170000
23440	20000
+ 326609	+ 330000
524975	520000

Difference between the actual sum and estimated sum is 524975 – 520000 = 4975.

4. a. Actual cost Estimated cost (rounding off to nearest tens)

₹378	₹380
₹1549	₹1550
₹352	₹350
+ ₹772	+ ₹770
₹3051	₹3050

Difference between actual cost and estimated cost is ₹(3051 – 3050) = ₹1.

Estimation is accurate.

b. Actual cost Estimated cost (rounding off to nearest hundreds)

₹378	₹400
₹1549	₹1500
₹352	₹400
+ ₹772	+ ₹800
₹3051	₹3100

Difference between estimated cost and actual cost is ₹(3100 – 3051) = ₹49.

Estimation is accurate.

Exercise 3.6

1–2. Refer answers at the end of the book.

3. a. One of the number = 97262987

Difference = – 88066143

Other number = 9196844

Other number is 9196844.

b. Sum = 78432178
One number = − 58543218
19888960

19888960 should be added to 58543218 to get 78432178.

c. Greatest number of 8 digits = 99999999
Number = − 63547458
36452541

36452541 should be added to 63547458 to get greatest 8-digit number.

d. Money earned = ₹5362187
Money spent = − ₹3267898
Money saved = ₹2094289

He saved ₹2094289.

e. Production after 2 years = 8632167
Production initially = − 5346247
3285920

Increase in the production was 3285920 bottles.

f. Greatest number = 9875410
Smallest number = − 1045789
Difference = 8829621

Difference between greatest and smallest numbers using the digits 8, 5, 7, 0, 1, 4 and 9 = 8829621

4. Do it yourself.

Exercise 3.7

1.–4. Refer answers at the end of the book.

Exercise 3.8

1. First find the sum of 25678232 and 33784701.

25678232
+ 33784701
59462933

Now subtract 59462933 from 79836260.

79836260
− 59462933
20373327

2. First find the sum of 1362521 and 2658324.

1362521
+ 2658324
4020845

Now find the sum of 4321624 and 5672158.

4321624
+ 5672158
9993782

Now subtract 4020845 from 9993782.

9993782
− 4020845
5972937

3. First find the sum of 74583267 and 2874032.

$$\begin{array}{r} 74583267 \\ +\ 2874032 \\ \hline 77457299 \end{array}$$

Now find the sum of 43874280 and 3264876.

$$\begin{array}{r} 43874280 \\ +\ 3264876 \\ \hline 47139156 \end{array}$$

Now subtract 47139156 from 77457299.

$$\begin{array}{r} 77457299 \\ -\ 47139156 \\ \hline 30318143 \end{array}$$

Thus, the sum of 74583267 and 2874032 is greater than the sum of 43874280 and 3264876 by 30318143.

4. First find the sum of 5672672 and 3821426.

$$\begin{array}{r} 5672672 \\ +\ 3821426 \\ \hline 9494098 \end{array}$$

Now subtract 9494098 from 10000000.

$$\begin{array}{r} 10000000 \\ -\ 9494098 \\ \hline 505902 \end{array}$$

5. First find the sum of the children less than 10 years old and then find the number of people in the age group of 10–70 years.

$$\begin{array}{r} 2173269 \\ +\ 2378621 \\ \hline 4551890 \end{array}$$

Now subtract 4551890 from 5834678.

$$\begin{array}{r} 5834678 \\ -\ 4551890 \\ \hline 1282788 \end{array}$$

There are 1282788 people whose age is more than 70 years.

6. First add the number of students who voted for winner and who voted for loser.

$$\begin{array}{r} 9447932 \\ +\ 7949268 \\ \hline 17397200 \end{array}$$

Now subtract this sum from the total number of student votes.

$$\begin{array}{r} 17849600 \\ -\ 17397200 \\ \hline 452400 \end{array}$$

$\therefore$ 452400 students did not vote in the election.

7. First add the amount allocated in the first year and second year.

$$\begin{array}{lr} \text{1st year} & ₹20844000 \\ \text{2nd year} & +\ ₹11582400 \\ \text{Total} = & ₹32426400 \end{array}$$

Now subtract this from the total annual allocation.

$$\begin{array}{r} ₹37814000 \\ -\ ₹32426400 \\ \hline ₹5387600 \end{array}$$

The remaining amount to be allocated in the third year is ₹5387600.

8. To find the number of magazine sold in July, subtract 4550000 from 21739298.

$$\begin{array}{r} 21739298 \\ -\ 4550000 \\ \hline 17189298 \end{array}$$

So, 17189298 magazines were sold in July. To find the number of magazines sold in August, add 7524000 to 17189298.

$$\begin{array}{r} 17189298 \\ +\ 7524000 \\ \hline 24713298 \end{array}$$

In the month of August, 24713298 magazines were sold.

9. Refer answers at the end of the book.

10. Do it yourself.

Mental Maths

1–5. Refer answers at the end of the book.

Test Your Skills

Multiple Choice Questions

1–5. Refer answers at the end of the book.

Apply Your Skills

Problem Solving Assessment

1. Number = (380165 + 264425) – (380165 – 264425) = 644590 – 115740 = 528850

2. 184 was added to 57384 instead of 148.
Therefore, answer would be greater by 184 – 148 = 36.

3. a. 1260 km + 1450 km = 2710 km
b. 1800 km + 1080 km = 2880 km
c. 1490 km + 1800 km + 1450 km = 4740 km
d. 1800 km + 1080 km + 2150 km + 1260 km = 6290 km

4. Quantity of grains left in the godown = 2753680 – (754260 + 542800) = 1456620 quintals

Value Based Questions

1. Number of books left = 73450 – 17345 = 56105, **Value:** Social responsibility

2. Area donated for dispensary = 394200 m^2 – 24350 m^2 = 369850 m^2, **Value:** Responsible citizen

HOTS

1. Each of the three friends contributed ₹10. So their total contribution was ₹10 ×3 = ₹30
Amount of bill for 3 tea = ₹25
Hence, the amount waiter returned = ₹30 – ₹25 = ₹5
Now, each friend picked ₹1, and ₹2 was given as tip to the waiter.
Therefore, total payment = ₹25 + ₹2 = ₹27
And final expenses beared by the three friends = ₹(10 – 1) × 3 = ₹27.
Thus, total payment = total expenses, there was no missing of money.

2. Total no. of hens, goats and camels = 50 + 45 + 8 = 103 (heads)
Total no. of legs of these animals = 50 × 2 + 45 × 4 + 8 × 4
= 100 + 180 + 32 = 312
Let no. of human keepers = ☺
So, no. of their heads = ☺ and their feet = 2 × ☺
Total no. of feet is 224 more than the no. of heads.
That means, 312 + 2 × ☺ = (103 + ☺) + 224
Or, 312 + 2 × ☺ = 327 + ☺
Or, ☺ = 327 – 312 =15
Thus, there are 15 human keepers in the caravan.

CHAPTER 4

Multiplication

Lesson Plan

OBJECTIVES

The students should know about

(i) Properties of multiplication

(ii) Word problems based on multiplication

(iii) Estimation of multiplication

Prerequisite Knowledge: The students should have the basic knowledge of the multiplication of smaller numbers as they have done in their previous classes.

Teaching Aids: Writing board, marker, chalks, chart, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics of this chapter will be taught in the class by taking some extra questions.

(i) **Properties of multiplication**

(a) When a number is multiplied by 0, it becomes 0.

(b) When a number is multiplied by 1, it remains the same.

(c) **Commutative property of multiplication:** If order of multiplication of two numbers is changed, the resulting number will be same.

$$12 \times 13 = 13 \times 12 = 156$$

(d) **Associative property of multiplication:** If grouping of the multiplication of three numbers is changed, the resulting number will be same.

$$12 \times (13 \times 15) = (12 \times 13) \times 15 = 2340$$

(ii) **Word Problems:** The cost of one book is ₹250, what will be the cost of 25 such books?

Cost of 1 book = ₹250

Cost of 25 such books = ₹250 × 25 = ₹6250

Recapitulation: The whole chapter will be revised in the class by taking some simple examples and the problems of the students will be solved immediately.

Home Assignments

(A) From Textbook

(i) Exercise 4.1—Solve Q. No. 1 and 2 all parts.

(ii) Exercise 4.3—Solve Q. No. 1 to 3 all parts.

(iii) Exercise 4.4—Solve Q. No. 1 to 5.

(iv) Exercise 4.5—Solve Q. No. 1, 2, 3 all parts.

(B) Extra Questions

(i) Multiply 365 and 105 and verify commutative property of multiplication.

(ii) Simplify: 365 × 1080 × 0 × 253

(iii) Simplify: 85623 × 100

Textbook Solutions

Exercise 4.1

1. a.
$$\begin{array}{r} 5621 \\ \times\ 7 \\ \hline 39347 \end{array}$$
Thirty-nine thousand three hundred forty-seven

b.
$$\begin{array}{r} 8625 \\ \times\ 9 \\ \hline 77625 \end{array}$$
Seventy-seven thousand six hundred twenty-five

c.
$$\begin{array}{r} 5678 \\ \times\ 63 \\ \hline 17034 \\ 34068\ \times \\ \hline 357714 \end{array}$$
Three lakh fifty-seven thousand seven hundred fourteen

d.
$$\begin{array}{r} 6254 \\ \times\ 32 \\ \hline 12508 \\ 18762\ \times \\ \hline 200128 \end{array}$$
Two lakh one hundred twenty-eight

e.
$$\begin{array}{r} 5544 \\ \times\ 33 \\ \hline 16632 \\ 16632\ \times \\ \hline 182952 \end{array}$$
One lakh eighty-two thousand nine hundred fifty-two

f.
$$\begin{array}{r} 8765 \\ \times\ 42 \\ \hline 17530 \\ 35060\ \times \\ \hline 368130 \end{array}$$
Three lakh sixty-eight thousand one hundred thirty

g.
$$\begin{array}{r} 6789 \\ \times\ 761 \\ \hline 6789 \\ 40734\times \\ 47523\times\times \\ \hline 5166429 \end{array}$$
Fifty-one lakh sixty-six thousand four hundred twenty-nine

h.
$$\begin{array}{r} 7878 \\ \times\ 820 \\ \hline 157560 \\ 63024\times\times \\ \hline 6459960 \end{array}$$
Sixty-four lakh fifty-nine thousand nine hundred sixty

2. a. Cost of 1 toy car = ₹4621
Cost of 7 toy cars = ₹4621 × 7 = ₹32347

b. Cost of 1 book = ₹46
Cost of 6214 books
= ₹46 × 6214
$$\begin{array}{r} 6214 \\ \times\ 46 \\ \hline 37284 \\ 24856\times \\ \hline 285844 \end{array}$$
Thus, cost of 6214 books is ₹285844.

c. Cost of 1 bicycle = ₹1562
Cost of 322 bicycles
= ₹1562 × 322
$$\begin{array}{r} 1562 \\ \times\ 322 \\ \hline 3124 \\ 3124\times \\ 4686\times\times \\ \hline 502964 \end{array}$$
Thus, cost of 322 bicycles is ₹502964.

d. To find the bill paid by Mr. Mohan add answers obtained in (i), (ii) and (iii).

i. Cost of 1 dress = ₹536
Cost of 8 dresses = ₹536 × 8 = ₹4288

ii. Cost of 1 book = ₹326
Cost of 63 books = ₹326 × 63
= ₹20538
$$\begin{array}{r} 326 \\ \times\ 63 \\ \hline 978 \\ 1956\times \\ \hline 20538 \end{array}$$

iii. Cost of 1 pizza = ₹232
Cost of 83 pizzas = ₹232 × 83
= ₹19256
$$\begin{array}{r} 232 \\ \times\ 83 \\ \hline 696 \\ 1856\times \\ \hline 19256 \end{array}$$

Total bill =
$$\begin{array}{r} ₹4288 \\ ₹20538 \\ +\ ₹19256 \\ \hline ₹44082 \end{array}$$
He paid ₹44082 in total.

e. Cost of one chair = ₹1486
Cost of 764 chairs = × 764

5944
8916×
+10402××
1135304

Cost of 764 chairs is ₹1135304.

3. Refer answers at the end of the book.

Exercise 4.2

1. Refer answers at the end of the book.

Exercise 4.3

1. a. 18357 × 69 = 165213 + 110142 = 1266633

b. 55555 × 26 = 333330 + 1111100 = 1444430

c. 60121 × 85 = 300605 + 4809680 = 5110285

d. 385462 × 18 = 3083696 + 3854620 = 6938316

e. 470896 × 81 = 470896 + 37671680 = 38142576

f. 764897 × 52 = 1529794 + 38244850 = 39774644

2. a. 26732 × 562 = 53464, 1603920, + 13366000 = 15023384

b. 83945 × 151 = 83945, 4197250, + 8394500 = 12675695

c. 57003 × 409 = 513027, 000000, + 228012 = 23314227

d. 254002 × 246 = 1524012, 10160080, + 50800400 = 62484492

e. 400634 × 323 = 1201902, 8012680, + 120190200 = 129404782

f. 605035 × 86 = 3630210 + 48402800 = 52033010

One crore fifty lakh twenty-three thousand three hundred eighty-four	One crore twenty-six lakh seventy-five thousand six hundred ninety-five	Two crore thirty-three lakh fourteen thousand two hundred twenty-seven	Six crore twenty-four lakh eighty-four thousand four hundred ninety-two	Twelve crore ninety-four lakh four thousand seven hundred eighty-two	Five crore twenty lakh thirty-three thousand ten

3. Refer answers at the end of the book.

Exercise 4.4

1. Product of 3254 and 74
= 3254 × 74 = 240796

3254 × 74 = 13016 + 227780 = 240796

Greatest number formed by the digits 4, 7, 5, 3, 6, 8 is 876543.

Now, 876543 − 240796 = 635747

2. Number of soap cakes in a carton = 450
Number of cartons = 1585
To find the number of soap cakes in 1585 cartons, multiply 1585 × 450.

1585 × 450 = 0000, 79250, + 634000 = 713250

There are 713250 soap cakes in the godown.

3. Smallest three-digit number using 5, 0, 7 is 507.
Greatest five-digit number = 99999
Product of 507 × 99999 = 50699493.

```
  99999
×   507
-------
 699993
 000000
+49999500
--------
 50699493
```

4. Number of toys made in one day = 326406
Number of toys made in 24 days = 326406 × 24

```
  326406
×     24
--------
 1305624
+6528120
--------
 7833744
```

7833744 toys are produced in 24 days.

5. Cost of 175 bags of urea = ₹356 × 175
= ₹62300
Cost of 214 bags of phosphorus
= ₹415 × 214
= ₹88810
Total amount spent by Surjeet singh
= ₹(62300 + 88810)
= ₹151110

6. Cost of 1 shirt = ₹156
Cost of 3624 shirts = ₹3624 × 156 = ₹565344

```
  3624
×  156
------
 21744
181200
+362400
------
 565344
```

Cost of 1 trouser = ₹867
Cost of 4567 trousers = ₹867× 4567
= ₹3959589

```
  4567
×  867
------
 31969
274020
+3653600
--------
 3959589
```

Total money earned by the shopkeeper
= ₹565344 + ₹3959589
= ₹4524933.

7. Weight of 1 bag = 150 kg
Number of bags of wheat a truck can carry = 883
Weight a truck can carry = 150 × 883 kg
= 132450 kg
Weight carried by 65 trucks = 132450 × 65 kg
= 8609250 kg

8. Number of bags of rice = 214
Weight of 1 bag rice = 95 kg
Total weight of 214 bags of rice = 214 × 95 kg
= 20330 kg

Cost of 1 kg rice = ₹38

Cost of 20330 kg rice = 38 × 20330 = ₹772540

9. One day earning = ₹957

One month or 26 days earning = ₹957 × 26 = ₹24882

One year (or 12 months) earning = ₹24882 × 12 = ₹298584

10. Do it yourself.

Exercise 4.5

1-4. Refer answers at the end of the book.

5. a. Sugar in a bag = 96 kg = 100 kg (approx)

Weight of 32 bags of sugar = 30 × 100 = 3000 kg

b. Rate of 1 ball = ₹18 = ₹20 (approx)

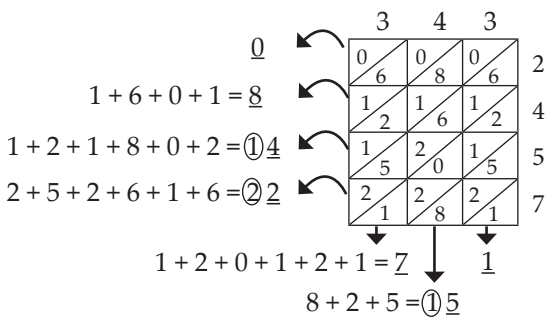
Rate of 243 balls = ₹240 × 20 = ₹4800

c. Cost of 1 kg of wheat = ₹24 = ₹20 (approx)

Cost of 374 kg of wheat = ₹370 × 20 = ₹7400

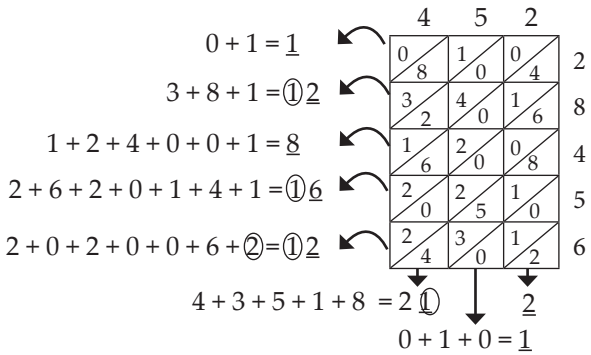
Exercise 4.6

1. a.



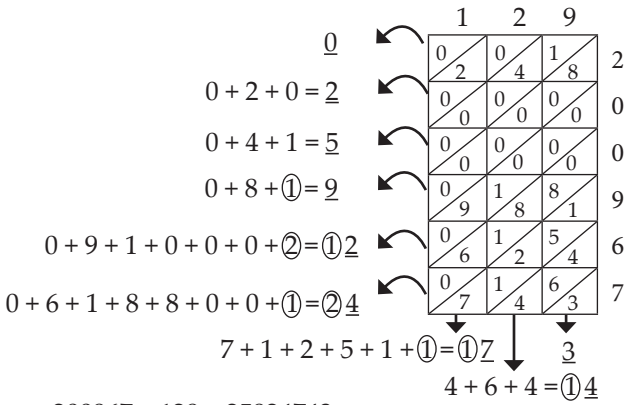
∴ 2457 × 343 = 842751

b.



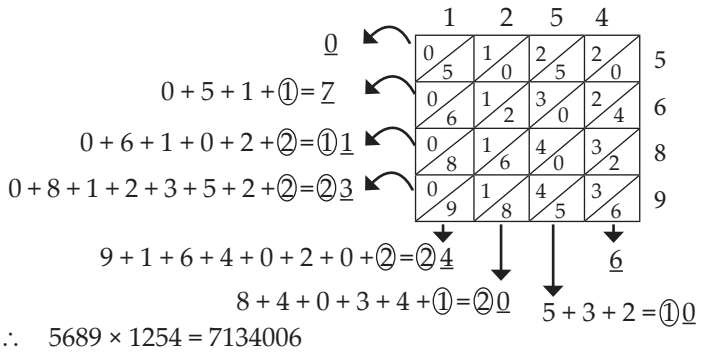
∴ 28456 × 452 = 12862112

c.



∴ 200967 × 129 = 25924743

e.



∴ 5689 × 1254 = 7134006

d and f. Similar working as above.

Test Your Skills

Multiple Choice Questions

1.–5. Refer answers at the end of the book.

Puzzles

1.

$$\begin{array}{r} 101 \\ \times\ 101 \\ \hline 101 \\ +\ 0000 \\ +\ 10100 \\ \hline 10201 \end{array}$$

$a = 1, b = 0$

2.

Steps	Activity	Outcome
1.	Think of a number	50
2.	Add 25	50 + 25 = 75
3.	Double it	75 × 2 = 150
4.	Add 40	150 + 40 = 190
5.	Divide by 2	$\frac{190}{2} = 95$
6.	Take away the number you started with.	95 – 50 = 45

Mental Maths

1. 2450 × 99 = 2450 × (100 – 1) = 245000 – 2450 = 242550

2. (2000 + 80 + 1) × 103 = 206000 + 8240 + 103 = 214343

3. Associative property

4. $400 \times 4000 = 1600000$, True

5. No. of lines in the notebook = $125 \times 27 = 3375$

Apply Your Skills

Problem Solving Assessment

1. Income on 1st day = ₹100

   Income on 2nd day = 2×100 = ₹200

   Income on 3rd day = 2×200 = ₹400 or $2 \times 2 \times 100$ = ₹400

   Income on 4th day = $2 \times 2 \times 2 \times 100$ = ₹800

   Income on 10th day = $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 100$ = ₹51,200

2. No. of biscuits = $60 \times 50 = 3000$

   No. of friends = 6

   No. of biscuits 6 friends have in a day = $6 \times 10 = 60$

   Number of days = $\frac{3000}{60} = 50$

3. Number of apples in a box = 48

   Number of apples in 240 boxes = 240×48 or Number of apples in a truck = 240×48

   Number of apples in 125 trucks = $125 \times 240 \times 48 = 1440000$

4. Number of books in one room = $72 \times 84 = 6048$

   Number of books in another room = $125 \times 43 = 5375$

   As $6048 > 5375$, so 1st room has more books.

Value Based Questions

1. Capacity of the auditorium = $90 \times 60 = 5400$ seats

   Number of seats reserved for physically handicapped = $10 \times 60 = 600$ seats

   Number of seats reserved for EWS category = $5 \times 60 = 300$ seats; **Value:** Social responsibility.

2. Number of icecreams in 5 packets = $5 \times 10 = 50$

   Cost of 5 packets = $5 \times$ ₹150 = ₹750; **Value:** Concern for poor.

HOTS

1. Height climbed by the mountaineer in a day = 473 metres

   Height climbed by the mountaineer in 16 days = $473 \times 16 = 7568$ metres

   Height left to climb = (8848 – 7568) m = 1280 m

2. Number of pencils = $58 \times 275 = 15950$

   Number of erasers = $72 \times 124 = 8928$

   Number of notebooks = $60 \times 45 = 2700$

CHAPTER 5

Division

Lesson Plan

OBJECTIVES

The students should know about
- (i) Division and its properties
- (ii) Relation between dividend, divisor, quotient and the remainder
- (iii) Word problems based on division process
- (iv) Estimation of division
- (v) Unitary method

Prerequisite Knowledge: The students should have the basic knowledge of division of smaller numbers as they have done in their previous classes.

Teaching Aids: Writing board, marker, chalks, charts, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics and sub-topics of this chapter will be taught in the class.

(i) **Properties of division**
- (a) If a number is divided by itself, the result is always 1.
- (b) If a number is divided by 1, the result will always be the same number.
- (c) Number divided by 0 will not be defined.
- (d) A number is said to be completely divisible by other number, if the remainder is 0.

(ii) **Division of big numbers by 2-digit numbers.**

Example: Divide 83505 by 15.

```
       5 5 6 7
15 ) 8 3 5 0 5 (
    - 7 5
    -----
      8 5
    - 7 5
    -----
      1 0 0
    -   9 0
    -------
        1 0 5
    -   1 0 5
    ---------
            0
```

(iii) **Word problems:** A school needs ₹15005 for a new project, how much money each of the 5 students have to pay?

Contributions of 5 students = ₹15005

∴ Contribution of 1 student = ₹15005 ÷ 5 = ₹3001

Recapitulation: The whole chapter will be revised in the class with simple examples. If the students have any problem, that will be solved immediately.

Home Assignments

(A) From Textbook

(i) Exercise 5.2—Solve Q. No. 1, 2, 3 all parts
(ii) Exercise 5.3—Solve Q. No. 1 and 2 all parts
(iii) Exercise 5.4—Solve Q. No. 1 to 3 all parts
(iv) Exercise 5.5—Solve Q. No. 1 to 10

(B) Extra Questions

(i) Divide 8537 by 231 and find the quotient and the remainder.
(ii) Divide 7456789 by 32 and verify your answer.
(iii) What will be the cost of a bicycle if a shopkeeper sold 275 bicycles for ₹479875?

Textbook Solutions

Exercise 5.1

1. a. 430 ÷ 5

```
5 | 430 | 86
  - 40
    30
  - 30
    ×
```

Q = 86

b. 544 ÷ 50

```
56 | 544 | 9
   - 504
     40
```

Q = 9, R = 40

c. 752 ÷ 164

```
164 | 752 | 4
    -656
      96
```

Q = 4, R = 96

d. 2016 ÷ 9

```
9 | 2016 | 224
  - 18
    21
  - 18
     36
  - 36
     ×
```

Q = 224

e. 6075 ÷ 81

```
81 | 6075 | 75
   - 567
     405
   - 405
     ×
```

Q = 75

f. 8928 ÷ 93

```
93 | 8928 | 96
   - 837
     558
   - 558
     ×
```

Q = 96

g. 3780 ÷ 254

```
254 | 3780 | 14
    - 254
      1240
    - 1016
       224
```

Q = 14, R = 224

h. 2016 ÷ 329

```
329 | 2016 | 6
    -1974
      42
```

Q = 6, R = 42

2. a. 12 objects = 1 dozen
3912 objects = 3912 ÷ 12 = 326
There are 326 dozens in 3912 objects.

```
   326
12 )3912(
  -36
   31
  -24
    72
  -72
    ×
```

b. Number of trees = 3256
Number of gardens = 37
Number of trees in each garden = 3256 ÷ 37
= 88
Number of trees in each garden is 88.

```
   88
37 )3256(
  -296
    296
   -296
    ×
```

c. Number to be multiplied = 4032 ÷ 72
= 56
∴ 56 should be multiplied by 72 to get 4032.

```
      56
72 )4032(
  -360
   432
  -432
     ×
```

d. Cost of 1 book = ₹104
Number of books that can be bought for ₹8424
= 8424 ÷ 104 = 81
∴ 81 books can be bought for ₹8424.

```
      81
104 )8424(
  -832
   104
  -104
     ×
```

e. Cost of 154 kg rice = ₹5236
Cost of 1 kg rice = ₹5236 ÷ 154
= ₹34
Cost of 1 kg rice is ₹34.

```
      34
154 )5236(
  -462
   616
  -616
     ×
```

Exercise 5.2

1.–2. Refer answers at the end of the book.
3. Do it yourself.

Exercise 5.3

1. a. 67892 ÷ 74

```
74 | 67892 | 917
   - 666
     129
   -  74
      552
   - 518
       34
```

Q = 917, R = 34

Verification
Dividend = Quotient × Divisor + Remainder
= 917 × 74 + 34
= 67858 + 34
= 67892

b. 54386 ÷ 86

```
86 | 54386 | 632
   - 516
     278
   - 258
      206
   - 172
       34
```

Q = 632, R = 34

Verification
Dividend = Quotient × Divisor + Remainder
= 632 × 86 + 34
= 54352 + 34
= 54386

c. 286752 ÷ 51

```
51 | 286752 | 5622
   - 255
     317
   - 306
      115
   - 102
       132
   - 102
        30
```

Q = 5622, R = 30

Verification
Dividend = Quotient × Divisor + Remainder
= 5622 × 51 + 30
= 286722 + 30
= 286752

d. 458432 ÷ 68

```
 68 | 458432 | 6741
   – 408
     504
   – 476
     283
   – 272
     112
   – 68
      44
```

Q = 6741, R = 44

Verification

Dividend = Quotient × Divisor + Remainder

= 6741 × 68 + 44

= 458388 + 44

= 458432

e. 726908 ÷ 58

```
 58 | 726908 | 12532
   – 58
     146
   – 116
     309
   – 290
     190
   – 174
      168
   – 116
       52
```

Q = 12532, R = 52

Verification

Dividend = Quotient × Divisor + Remainder

= 12532 × 58 + 52

= 726856 + 52

= 726908

f. 2947349 ÷ 36

```
 36 | 2947349 | 81870
   – 288
     67
   – 36
     313
   – 288
     254
   – 252
      29
   – 29
      29
```

Q = 81870, R = 29

Verification

Dividend = Quotient × Divisor + Remainder

= 81870 × 36 + 29

= 2947320 + 29

= 2947349

g. 1075602 ÷ 84

```
 84 | 1075602 | 12804
   – 84
     235
   – 168
     676
   – 672
     402
   – 336
      66
```

Q = 12804, R = 66

Verification

Dividend = Quotient × Divisor + Remainder

= 12804 × 84 + 66

= 1075536 + 66

= 1075602

h. 64836921 ÷ 59

```
59 | 64836921 | 1098930
   - 59
     583
   - 531
     526
   - 472
     549
   - 531
     182
   - 177
      51
   - 00
      51
```

Q = 1098930, R = 51

Verification

Dividend = Quotient × Divisor + Remainder
= 1098930 × 59 + 51
= 64836870 + 51
= 64836921

2. a. Dividend = Divisor × Quotient + Remainder
= 47 × 321 + 13
= 15087 + 13
= 15100

∴ Dividend = 15100

b. Quotient = (Dividend – Remainder) ÷ Divisor
= (637428 – 12) ÷ 24
= 637416 ÷ 24
= 26559

∴ Quotient = 26559

c. Dividend = Quotient × Divisor + Remainder
= 52643 × 38 + 28
= 2000434 + 28
= 2000462

∴ Dividend = 2000462

d. Dividend = 56783
Divisor = 62

```
62 | 56783 | 915
   - 558
     98
   - 62
     363
   - 310
      53
```

Q = 915, R = 53

e. Dividend = 789615
Divisor = 26

```
26 | 789615 | 30369
   - 78
     96
   - 78
     181
   - 156
      255
   - 234
       21
```

Q = 30369, R = 21

f. Dividend = 8765419

Divisor = 69

```
69 | 8765419 | 127035
   – 69
     186
   – 138
      485
    – 483
       241
     – 207
        349
      – 345
         4
```

Q = 127035, R = 4

Exercise 5.4

1. Refer answers at the end of the book.

2. a. 86732 ÷ 371

```
371 | 86732 | 233
    – 742
      1253
    – 1113
      1402
    – 1113
       289
```

Q = 233, R = 289

Verification

Dividend = Quotient × Divisor + Remainder

= 233 × 371 + 289

= 86443 + 289

= 86732

b. 96753 ÷ 632

```
632 | 96753 | 153
    – 632
      3355
    – 3160
      1953
    – 1896
       57
```

Q = 153, R = 57

Verification

Dividend = Quotient × Divisor + Remainder

= 153 × 632 + 57

= 96696 + 57

= 96753

c. 876543 ÷ 423

```
423 | 876543 | 2072
    – 846
      3054
    – 2961
       0933
     – 846
       87
```

Q = 2072, R = 87

Verification

Dividend = Quotient × Divisor + Remainder

= 2072 × 423 + 87

= 876456 + 87

= 876543

d. 554433 ÷ 675

675 | 554433 | 821

− 5400

1443

− 1350

933

− 675

258

Q = 821, R = 258

Verification

Dividend = Divisor × Quotient + Remainder

= 675 × 821 + 258

= 554175 + 258

= 554433

e. 5028672 ÷ 252

252 | 5028672 | 19955

− 252

2508

− 2268

2406

− 2268

1387

− 1260

1272

− 1260

12

Q = 19955, R = 12

Verification

Dividend = Divisor × Quotient + Remainder

= 252 × 19955 + 12

= 5028660 + 12

= 5028672

f. 4167620 ÷ 515

515 | 4167620 | 8092

− 4120

4762

− 4635

1270

− 1030

240

Q = 8092, R = 240

Verification

Dividend = Divisor × Quotient + Remainder

= 515 × 8092 + 240

= 4167380 + 240

= 4167620

g. 23021405 ÷ 148

148 | 23021405 | 155550

− 148

822

− 740

821

− 740

814

− 740

740

− 740

5

Q = 155550, R = 5

Verification

Dividend = Divisor × Quotient + Remainder

= 148 × 155550 + 5

= 23021400 + 5

= 23021405

h. 35607520 ÷ 227

```
227 | 35607520 | 156861
    - 227
      1290
    - 1135
      1557
    - 1362
       1955
     - 1816
       1392
     - 1362
        300
      - 227
         73
```

Q = 156861, R = 73

∴ Dividend = Divisor × Quotient + Remainder
= 227 × 156861 + 73
= 35607447 + 73
= 35607520

3. a. Dividend = Divisor × Quotient + Remainder
= 321 × 1234 + 46
= 396114 + 46
= 396160

∴ Dividend = 396160

b.

```
425 | 5632471 | 13252
    - 425
      1382
    - 1275
      1074
    - 850
      2247
    - 2125
       1221
     - 850
        371
```

Q = 13252, R = 371

c. Dividend = Divisor × Quotient + Remainder
Divisor = (Dividend – Remainder) ÷ Quotient
= (4823597 – 893) ÷ 5008
= 4822704 ÷ 5008
= 963

d. Remainder = Dividend – Divisor × Quotient
= 52156789 – 235 × 221943
= 52156789 – 52156605

Remainder = 184

e. Dividend = Quotient × Divisor + Remainder
= 58841 × 835 + 530
= 49132235 + 530
= 49132765

Yes, the given sum is correct.

Exercise 5.5

1. Divisor = 435 Quotient = 5643 Remainder = 46

∴ Dividend = Divisor × Quotient + Remainder

= 435 × 5643 + 46

= 2454705 + 46

= 2454751

∴ The number was 2454751.

2. Apples in one carton = 563

Cartons required to pack 18241275 apples = 18241275 ÷ 563

```
563 | 18241275 | 32400
    – 1689
      1351
    – 1126
       2252
     – 2252
         75
```

∴ 32400 cartons are required to pack 18241275 apples and 75 apples will be left.

3. To find the number that must be subtracted from 186039 so that the given number 186039, is exactly divisible by 328, we need to find the remainder when 186039 is divided by 328.

```
328 | 186039 | 567
    – 1640
      2203
    – 1968
       2359
     – 2296
         63
```

∴ 63 must be subtracted from 186039 to make it exactly divisible by 328.

4. Greatest 6-digit number = 999999

Greatest 3-digit number using 7, 8 and 9 = 987

Now divide 999999 by 987 and subtract the remainder, so obtained from 999999 to get the largest six digit number divisible by 987.

```
987 | 999999 | 1013
    – 987
      1299
    – 987
       3129
     – 2961
        168
```

∴ 999999 – 168 = 999831

∴ 999831 is the largest six-digit number exactly divisible by 987.

5. 3427895 + 8261439 = 11689334

```
257 | 11689334 | 45483
    - 1028
      1409
    - 1285
       1243
     - 1028
        2153
      - 2056
          974
        - 771
          203
```

Sum of the given number is not exactly divisible by 257 and remainder is 203.

6. Number of students = 856

Total amount collected = 342400 paise

= ₹3424 (divide 342400 by 100)

Amount donated by each student = ₹3424 ÷ 856

= ₹4

∴ Each student donated ₹4.

7. Selling price of 275 bicycles = ₹479875

Selling price of 1 bicycle = ₹479875 ÷ 275

= ₹1745

8. Total students = 67 + 73 = 140

Total mess fees paid = ₹1571080

Mess fees paid by one student = ₹1571080 ÷ 140

= ₹11222

∴ Each student paid ₹11222.

9. Cost of 364 microchips = ₹1257984

Cost of 1 microchip = ₹1257984 ÷ 364

= ₹3456

Cost of 136 defective microchips = ₹3456 × 136

= ₹470016

Cost of remaining microchips = ₹1257984 – ₹470016

= ₹787968

10. Greatest 7-digit number = 9999999

Greatest number using 3, 7, 4 = 743

```
743 | 9999999 | 13458
    - 743
      2569
    - 2229
       3409
     - 2972
        4379
      - 3715
          6649
        - 5944
          705
```

Divisor = 743 Quotient = 13458
Dividend = 9999999 Remainder = 705
Dividend = Divisor × Quotient + Remainder
= 743 × 13458 + 705

11. Total consumption of vegetables in the month of August to November = 47963324
Total days in August + September + October + November
= 31 + 30 + 31 + 30
= 122
Consumption of vegetables in a day = 47963324 ÷ 122
= 393142 kg
∴ 393142 kg of vegetables is consumed per day.

12. Do it yourself.

Exercise 5.6

1. a. 149 is rounded to 150
45 is rounded to 50
∴ 150 ÷ 50 = 3

b. 184 is rounded to 180
63 is rounded to 60
∴ 180 ÷ 60 = 3

c. 396 is rounded to 400
44 is rounded to 40
∴ 400 ÷ 40 = 10

d. 719 is rounded to 720
84 is rounded to 80
∴ 720 ÷ 80 = 9

e. 2974 is rounded to 2970
31 is rounded to 30
∴ 2970 ÷ 30 = 99

f. 2877 is rounded to 2880
77 is rounded to 80
∴ 2880 ÷ 80 = 36

g. 4863 is rounded to 4860
63 is rounded to 60
∴ 4860 ÷ 60 = 81

h. 5849 is rounded to 5850
49 is rounded to 50
∴ 5850 ÷ 50 = 117

Exercise 5.7

1. Weight of 1 bag = $\frac{150}{5}$ = 30 kg

2. No. of pens in 1 box = $\frac{250}{5}$ = 50
No. of pens in 40 boxes = 50 × 40 = 2000

3. Time taken to fill full water tank = 2 × 2 = 4 hours
Time taken to fill 5 water tanks by water pipe = 4 × 5 = 20 hours

4. No. of words Nimit typed in 1 second = $\frac{16}{8}$ = 2
No. of words Nimit typed in 2 minutes = 2 × 60 × 2 = 240

5. Weight of 1 gold piece = $\frac{1620}{15}$ = 108 g
No. of gold pieces = $\frac{7560}{108}$ = 70

6. Length of 1 wire = $\frac{90}{6}$ = 15 m

a. Length of 10 wires = 15 × 10 = 150 m

b. No. of wires for 30 m = $\frac{30}{15}$ = 2

7. Distance covered by athlete in 1 minute = $\frac{480}{8}$ = 60 metres

Distance covered by athlete in 20 minutes = 60 × 20 = 1200 metres

So, athlete can cover 1200 m or 1 km 200 m in 20 minutes.

8. Same working as above.

```
      60342
162 ) 9775404
     -972
      554
     -486
      680
     -648
      324
     -324
        ×
```

Test Your Skills

Multiple Choice Questions

1.–5. Refer answers at the end of the book.

Apply Your Skills

Problem Solving Assessment

1. Number of pieces = 22600 ÷ 90 = 251

```
90 | 22600 | 251
   - 180
     460
   - 450
     100
   - 90
      10
```

2. Amount donated by a family = ₹9775404 ÷ 162 = ₹60342

3. Number of stands = 20000 ÷ 225 = 88

```
225 | 20000 | 88
    - 1800
      2000
    - 1800
       200
```

Number of people left out = 200

4. To find the least number, divide 72800 by 83 and then subtract the remainder from 72800.

```
83 | 72800 | 877
   - 664
     640
   - 581
     590
   - 581
       9
```

Number exactly divisible by 83 = 72800 – 9 = 72791

72791 ÷ 83 = 877

Thus, 9 is the required number.

5. To find the least number, we first divide 46216 by 258.

179 × 258 = 46182 < 46216

So, we take the quotient as 180.

180 × 258 = 46440

Now, subtract 46440 – 46216 = 224

Thus, least number that should be added to be 224.

```
258 | 46216 | 179
    - 258
      2041
    - 1806
      2356
    - 2322
       34
```

Value Based Questions

1. Money 782 people donated = ₹3406392

So, money donated by 1 person = $\frac{3406392}{782}$ = ₹4356

Money 987 people will donate = ₹4356 × 987 = ₹42,99,372; **Value:** Care for others

2. Number of months = 4,00,000 ÷ 2000 = 400 ÷ 2 = 200

Number of months and years = 200 months ÷ 12 = 16 years 8 months; **Value:** Social work

3. Number of minutes = 14400 ÷ 60 = 240

Number of hours = 240 ÷ 60 = 4; **Value:** Sincerity

HOTS

1. We will take 2 at ones and thousands places as the number lies between 2000 and 3000.

Hundreds digit = 2 × 2 – 1 = 3

Tens digit is a prime number less than 3, so it is 2.

Th	H	T	O
2	3	2	2

Also, 2322 is divisible by 129.

2. Water in 25 tanks = 25 × 3000 = 75000 litres

No. of drums = 15 × 25 = 375.

Mental Maths

1–5. Refer answers at the end of the book.

CHAPTER 6

Multiples and Factors

Lesson Plan

OBJECTIVES

The students should know about

(i) Factors and common factors
(ii) Multiples and common multiples
(iii) Prime and composite numbers
(iv) Even and odd numbers
(v) Divisibility rules
(vi) LCM and HCF
(vii) Relationship between LCM and HCF

Prerequisite Knowledge: The students should have the basic knowledge of factors and multiples as they have done in their previous classes.

Teaching Aids: Writing board, marker, chalks, charts, duster, geometrical box, smart-board/ projector and pointer.

Method of Teaching: The following topics and sub-topics included in this chapter will be taught in the class with some simple and suitable examples.

(i) **Factors and Common factors**

Factors of 10 = ①, 2, ⑤, 10

Factors of 15 = ①, 3, ⑤, 15

Common factor = 15

(ii) **Prime and Composite numbers**

(a) **Prime numbers:** Numbers which are not divisible by any number except 1 or itself.
Example, 2, 3, 5, 7, 11, 13, … (1 is not prime)

(b) **Twin Prime Numbers:** A pair of prime numbers which are differ by 2.
(2, 3), (3, 5), (5, 7), (11, 13), (17, 19), etc.

(iii) **Composite Numbers:** A number which has more than two factors.
Example, 6 = 1, 2, 3, 6; 12 = 1, 2, 3, 4, 6, 12

(iv) **Lowest Common Multiple (LCM)**

Example: Find the LCM of 12 and 18.

Multiples of 12 = 12, 24, ㊱, 48, 60, ㉗, ...

Multiples of 18 = 18, ㊱, 54, 72, ㊿, ...

Common multiples = 36, 72, ...

∴ LCM = 36

(v) **Highest Common Factors**

Example: Find the HCF of 24 and 30.

Factors of 24 = ①, ②, ③, 4, ⑥, 8, 12, 24

Factors of 30 = ①, ②, ③, 5, ⑥, 10, 15, 30

Common factors = 1, 2, 3 and 6

∴ HCF = 6

Recapitulation: The whole chapter will be revised in the class by involving the students in group and the problem of the students will be solved immediately.

Home Assignments

(A) From Textbook

(i) Exercise 6.1—Solve Q. No. 1 to 5 all parts.
(ii) Exercise 6.3—Solve Q. No. 1 to 8 all parts.
(iii) Exercise 6.4—Solve Q. No. 1 to 3 all parts.

(B) Extra Questions

(i) Find the LCM of 8, 12, 20 and 24.
(ii) Find the HCF of 24 and 36.
(iii) Write all the prime numbers less than 50.
(iv) Write all the twin prime numbers between 10 and 60.

Textbook Solutions

Exercise 6.1

1. Refer answers at the end of the book.

2. a. $9 \overline{)\ 36\ } 4$

-36

0

Since remainder is zero, hence 9 is a factor of 36.

b. $13 \overline{)\ 216\ } 16$

-13

86

-78

6

Remainder is 6, so 13 is not a factor of 216.

c. $25 \overline{)\ 125\ } 5$

-125

$\times$

$\therefore$ 25 is a factor of 125.

3. a. $24 = 1 \times 24, 2 \times 12, 3 \times 8, 4 \times 6, 6 \times 4$

$\therefore$ Factors of 24 are 1, 2, 3, 4, 6, 8, 12 and 24

b. $36 = 1 \times 36, 2 \times 18, 3 \times 12, 4 \times 9, 6 \times 6$

$\therefore$ Factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18 and 36.

c. $80 = 1 \times 80, 2 \times 40, 4 \times 20, 5 \times 16, 8 \times 10$

Factors of 80 are 1, 2, 4, 5, 8, 10, 16, 20, 40 and 80.

d. $108 = 1 \times 108, 2 \times 54, 3 \times 36, 4 \times 27, 6 \times 18, 9 \times 12$

Factors of 108 are 1, 2, 3, 4, 6, 9, 12, 18, 27, 36, 54 and 108.

e. $225 = 1 \times 225, 3 \times 75, 5 \times 45, 15 \times 15, 9 \times 25$

$\therefore$ Factors of 225 are 1, 3, 5, 9, 15, 25, 45, 75 and 225.

4. a. Factors of 14 are ①, 2, ⑦, 14.

Factors of 35 are ①, 5, ⑦, 35.

Common factors of 14 and 35 are 1 and 7.

b. Factors of 27 are ①, ③, ⑨, 27

Factors of 36 are ①, 2, ③, 4, 6, ⑨, 12, 18, 36

Common factors of 27 and 36 are 1, 3 and 9.

c. Factors of 48 are ①, ②, 3, ④, 6, ⑧, 12, ⑯, 24, 48

Factors of 32 are ①, ②, ④, ⑧, ⑯, 32

Common factor of 48 and 32 are 1, 2, 4, 8 and 16.

d. Factors of 36 are ①, 2, ③, 4, 6, ⑨, 12, 18, 36

Factors of 45 are ①, ③, 5, ⑨, 15, 45

Common factors of 36 and 45 are 1, 3 and 9.

e. Factors of 64 are ①, ②, ④, ⑧, ⑯, ㉜, 64

Factors of 96 are ①, ②, 3, ④, ⑥, ⑧, ⑯, ㉜, 48, 96

Common factors of 64 and 96 are 1, 2, 4, 8, 16 and 32.

5–8. Refer answers at the end of the book.

Exercise 6.2

1. a. 36 is a composite number as it has more than 2 factors, i.e., 1, 2, 3, 4, 6, 9, 12, 18, 36 are its factors.

b. 37 is prime as it has only two factors 1 and 37.
c. 31 is prime as it has only two factors 1 and 31.
d. 59 is a prime as it has only two factors 1 and 59.
e. 81 is a composite as its has more than two factors, i.e., 1, 3, 9, 27 and 81.

2–9. Refer answers at the end of the book.

10. a. 15 and 33
Factors of 15 are 1, 3, 5, 15
Factors of 33 are 1, 3, 11, 33
Common factors of 15 and 33 are 1 and 3.
∴ 15 and 33 are not co-prime as they have 3 as common factor other than 1.

b. 24 and 29
Factors of 24 are 1, 2, 3, 4, 6, 8, 12 and 24
Factors of 29 are 1, 29
Common factors of 24 and 29 is 1 only. Hence they are co-prime.

c 34 and 57
Common factors of 34 are 1, 2, 17, 34
Common factors of 57 are 1, 3, 19, 57
Common factors of 34 and 57 is 1. Hence 34 and 57 are co-prime.

d. 18 and 67
Factors of 18 are 1, 2, 3, 6, 9 and 18
Factors of 67 are 1, 67
Common factors of 18 and 67 is 1. Hence 18 and 67 are co-prime.

e. 14 and 52
Factors of 14 are 1, 2, 7 and 14
Factors of 52 are 1, 2, 4, 13, 26, 52
Common factors of 14 and 52 is 1 and 2. Hence they are not co-prime.

Exercise 6.3

1. Refer answers at the end of the book.

2. a. 4623 and e. 8875 unit digits are 3 and 5 so they are not divisible by 2.
b. 9000 c 1438 d. 7596 and
f. 20014 has units digits as 0, 8, 6 and 4 so they all are divisible by 2.

3. a. 3123 = 3 + 1 + 2 + 3 = 9
b. 4826 = 4 + 8 + 2 + 6 = 20
c. 52596 = 5 + 2 + 5 + 9 + 6 = 27
d. 76321 = 7 + 6 + 3 + 2 + 1 = 19
e. 84463 = 8 + 4 + 4 + 6 + 3 = 25
Sum of digits of a. and c. is divisible by 3, hence 3123 and 52596 are divisible by 3.

4. a. 486 b. 512 c. 4920
d. 7773 e. 9636 f. 58862
The number formed by last two digits of b, c and e, i.e., 12, 20 and 36 are divisible by 4, hence b, c and e are divisible by 4.

5. a. 5912 b. 7732 c. 9008
d. 46246 e. 83224

Since 912, 008, 224 are divisible by 8, so the number 5912, 9008 and 83224 are divisible by 8.

6. a. 6987 = 6 + 9 + 8 + 7 = 30 b. 8424 = 8 + 4 + 2 + 4 = 18
c. 9405 = 9 + 4 + 0 + 5 = 18 d. 50049 = 5 + 0 + 0 + 4 + 9 = 18
e. 68978 = 6 + 8 + 9 + 7 + 8 = 38

Sum of digits of 8424, 9405 and 50049 is divisible by 9, so 8424, 9405 and 50049 are divisible by 9.

7. a. $\square$ + 5 + 9 + 2 + 1 = 17 + $\square$

A number greater than 17 divisible by 3 is 18, so 18 – 17 = 1 should be there in the box as the smallest digit so that the number so formed is divisible by 3.

b. 8 + $\square$ + 2 + 2 = 12 + $\square$

12 is divisible by 3, so the smallest digit that can be filled in the blank is 0.

c. 59 $\square$ 6; Sum of digits = 5 + 9 + 6 + $\square$ = 20 + $\square$

The smallest number greater than 20 but divisible by 3 is 21, so 21 – 20 = 1 should be at the blank space.

d. 52 $\square$ 51

5 + 2 + 5 + 1 + $\square$ = 13 + $\square$

The smallest number greater than 13 and divisible by 3 is 15. So 15 – 13 = 2 should be the digit at the blank space.

8. a. 495 $\square$ 8

0 as 08 or 8 is divisible by 4.

b. 340 $\square$ 2

1 as 12 is divisible by 4.

c. 5425 $\square$

2 as 52 is divisible by 4.

d. 3927 $\square$

2 as 72 is divisible by 4.

9. a. 365 $\square$

6 as 656 is divisible by 8.

b. 3726 $\square$

4 as 264 is divisible by 8.

c. 637 $\square$ 4

0 as 704 is divisible by 8.

d. 83 $\square$ 2

1 as 312 is divisible by 8.

10. a. 572 $\square$ = 5 + 7 + 2 + $\square$ = 14 + $\square$

A number greater than 14, divisible by 9 is 18, hence 18 – 14 = 4 is the digit to be fitted in the blank space.

b. 47 $\square$ 58 = 4 + 7 + 5 + 8 + $\square$ = 24 + $\square$

A number greater than 24 but divisible by 9 is 27, so 27 – 24 = 3 is the digit to be fitted in the blank space.

c. 197 $\square$ 5 = 1 + 9 + 7 + 5 + $\square$ = 22 + $\square$

A number greater than 22, but divisible by 9 is 27, hence 27 – 22 = 5 is the digit to be fitted in the blank space.

d. 4 $\square$ 12 = 4 + 1 + 2 + $\square$ = 7 + $\square$

A number greater than 7, but divisible by 9 is 9, hence 9 – 7 = 2. So 2 is to be fitted in the blank space.

Exercise 6.4

1. a. 24, 33

Factors of 24 = ①, 2, ③, 4, 6, 8, 12, 24

Factors of 33 = ①, ③, 11, 33

Common factors of 24 and 33 = 1 and 3

∴ HCF of 24 and 33 = 3

b. 36, 252

Factors of 36 = ①, ②, ③, ④, ⑥, ⑨, ⑫, ⑱, ㊱

Factors of 252 = ①, ②, ③, ④, ⑥, 7, ⑨, ⑫, 14, ⑱, 21, 28, ㊱, 42, 63, 84, 126, 252

Common factors of 36 and 252 = 1, 2, 3, 4, 9, 12, 18, 36

∴ HCF = 36

c.–e. Similar working as above.

2. a. 42, 84

2 | 42
3 | 21
7 | 7
| 1

2 | 84
2 | 42
3 | 21
7 | 7
| 1

$42 = \boxed{2} \times \boxed{3} \times \boxed{7}$

$84 = \boxed{2} \times \boxed{3} \times \boxed{7} \times 2$

∴ HCF of (42, 84) = 2 × 3 × 7 = 42.

b. 36, 63

2 | 36
2 | 18
3 | 9
3 | 3
| 1

3 | 63
3 | 21
7 | 7
| 1

$36 = 2 \times 2 \times \boxed{3} \times \boxed{3}$

$63 = \quad 7 \times \boxed{3} \times \boxed{3}$

∴ HCF of (36, 63) = 3 × 3 = 9.

c. 25, 90

5 | 25
5 | 5
| 1

2 | 90
5 | 45
3 | 9
3 | 3
| 1

$25 = 5 \times \boxed{5}$

$90 = 2 \times \boxed{5} \times 3 \times 3$

∴ HCF of (25, 90) = 5

d. 12, 18, 27

2 | 12
2 | 6
3 | 3
| 1

2 | 18
3 | 9
3 | 3
| 1

3 | 27
3 | 9
3 | 3
| 1

$12 = 2 \times 2 \times \boxed{3}$

$18 = 2 \times 3 \times \boxed{3}$

$27 = 3 \times 3 \times \boxed{3}$

∴ HCF of (12, 18, 27) = 3

e. 18, 24, 32

2 | 18
3 | 9
3 | 3
| 1

2 | 24
2 | 12
2 | 6
3 | 3
| 1

2 | 32
2 | 16
2 | 8
2 | 4
2 | 2
| 1

$18 = \boxed{2} \times 3 \times 3$

$24 = \boxed{2} \times 2 \times 2 \times 3$

$32 = \boxed{2} \times 2 \times 2 \times 2 \times 2$

∴ HCF of (18, 24, 32) = 2

f. 22, 66, 121

2 | 22
11 | 11
| 1

2 | 66
3 | 33
11 | 11
| 1

11 | 121
11 | 11
| 1

$22 = 2 \times 11$

$66 = 2 \times 3 \times 11$

$121 = \quad 11 \times 11$

∴ HCF of (22, 66, 121) = 11

g. 25, 65, 95

$$\begin{array}{r|r} 5 & 25 \\ \hline 5 & 5 \\ \hline & 1 \end{array} \quad \begin{array}{r|r} 5 & 65 \\ \hline 13 & 13 \\ \hline & 1 \end{array} \quad \begin{array}{r|r} 5 & 95 \\ \hline 19 & 19 \\ \hline & 1 \end{array}$$

$25 = \boxed{5} \times 5$

$65 = \boxed{5} \times 13$

$95 = \boxed{5} \times 19$

∴ HCF of 25, 65, 95 = 5

h. 64, 80, 120

$$\begin{array}{r|r} 2 & 64 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array} \quad \begin{array}{r|r} 2 & 80 \\ \hline 2 & 40 \\ \hline 2 & 20 \\ \hline 2 & 10 \\ \hline 5 & 5 \\ \hline & 1 \end{array} \quad \begin{array}{r|r} 2 & 120 \\ \hline 2 & 60 \\ \hline 2 & 30 \\ \hline 3 & 15 \\ \hline 5 & 5 \\ \hline & 1 \end{array}$$

$64 = \boxed{2} \times \boxed{2} \times \boxed{2} \times 2 \times 2 \times 2$

$80 = \boxed{2} \times \boxed{2} \times \boxed{2} \times 2 \times 5$

$120 = \boxed{2} \times \boxed{2} \times \boxed{2} \times 3 \times 5$

∴ HCF of (64, 80, 120) = 2 × 2 × 2 = 8

i. 108, 136, 152

$$\begin{array}{r|r} 2 & 108 \\ \hline 2 & 54 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array} \quad \begin{array}{r|r} 2 & 136 \\ \hline 2 & 68 \\ \hline 2 & 34 \\ \hline 17 & 17 \\ \hline & 1 \end{array} \quad \begin{array}{r|r} 2 & 152 \\ \hline 2 & 76 \\ \hline 2 & 38 \\ \hline 19 & 19 \\ \hline & 1 \end{array}$$

$108 = \boxed{2} \times \boxed{2} \times 3 \times 3 \times 3$

$136 = \boxed{2} \times \boxed{2} \times 2 \times 17$

$152 = \boxed{2} \times \boxed{2} \times 2 \times 19$

∴ HCF of (108, 136, 152) = 2 × 2 = 4

3. a. 12, 28

$$\begin{array}{l} 12 \,\big)\, 28 \,(\, 2 \\ \quad -24 \\ \quad\;\; 4 \,\big)\, 12 \,(\, 3 \\ \qquad\quad -12 \\ \qquad\qquad \times \end{array}$$

∴ HCF of (12, 28) = 4.

b. 42, 330

$$\begin{array}{l} 42 \,\big)\, 330 \,(\, 7 \\ \quad -294 \\ \qquad 36 \,\big)\, 42 \,(\, 1 \\ \qquad\quad -36 \\ \qquad\qquad 6 \,\big)\, 36 \,(\, 6 \\ \qquad\qquad\quad -36 \\ \qquad\qquad\qquad \times \end{array}$$

∴ HCF of (42, 330) = 6.

c. 78, 210

$$\begin{array}{l} 78 \,\big)\, 210 \,(\, 2 \\ \quad -156 \\ \qquad 54 \,\big)\, 78 \,(\, 1 \\ \qquad\quad -54 \\ \qquad\qquad 24 \,\big)\, 54 \,(\, 2 \\ \qquad\qquad\quad -48 \\ \qquad\qquad\qquad 6 \,\big)\, 24 \,(\, 4 \\ \qquad\qquad\qquad\quad -24 \\ \qquad\qquad\qquad\qquad \times \end{array}$$

∴ HCF of (78, 210) = 6.

d. 60, 420 and 924

$$\begin{array}{l} 60 \,\big)\, 420 \,(\, 7 \\ \quad -420 \\ \qquad \times \end{array}$$

$$\begin{array}{l} 60 \,\big)\, 924 \,(\, 15 \\ \quad -60 \\ \quad\;\; 324 \\ \quad -300 \\ \qquad 24 \,\big)\, 60 \,(\, 2 \\ \qquad\quad -48 \\ \qquad\qquad 12 \,\big)\, 24 \,(\, 2 \\ \qquad\qquad\quad -24 \\ \qquad\qquad\qquad \times \end{array}$$

∴ HCF of (60, 420, 924) = 12.

e. 154, 770, 910

154 | 770 | 5
− 770
×

154 | 910 | 5
− 770

140 | 154 | 1
− 140

14 | 140 | 10
− 140
×

∴ H.C.F. (154, 770, 910) = 14.

f. 210, 420, 540

210 | 420 | 2
− 420
×

210 | 540 | 2
− 420

120 | 210 | 1
− 120

90 | 120 | 1
− 90

30 | 90 | 3
− 90
×

∴ HCF of (210, 420, 540) = 30.

Exercise 6.5

1. a. 30, 75

Multiples of 30 = 30, 60, 90, 120, (150), 80

Multiples of 75 = 75, (150), 225

Common multiples of 30 and 75 = 150, 300, ...

∴ LCM of (30, 75) = 150

b. 45, 66

3	45, 66
2	15, 22
3	15, 11
5	5, 11
11	1, 11
	1, 1

LCM of (45, 66)
= 3 × 2 × 3 × 5 × 11
= 990

c. 20, 25, 60

5	20, 25, 60
2	4, 5, 12
2	2, 5, 6
5	1, 5, 3
3	1, 1, 3
	1, 1, 1

∴ LCM of (20, 25, 60)
= 5 × 2 × 2 × 5 × 3
= 300

d. 36, 63, 81

3	36, 63, 81
3	12, 21, 27
3	4, 7, 9
3	4, 7, 3
7	4, 7, 1
2	4, 1, 1
2	2, 1, 1
	1, 1, 1

∴ LCM of (36, 63, 81)
= 3 × 3 × 3 × 3 × 7 × 2 × 2
= 2268

2. a. 28, 35

2	28
2	14
7	7
	1

5	35
7	7
	1

28 = 2 × 2 × 7
35 = 5 × 7
LCM = 2 × 2 × 5 × 7 = 140
∴ LCM of (28, 35) = 140

b. 48, 72

2	48
2	24
2	12
2	6
3	3
	1

2	72
2	36
2	18
3	9
3	3
	1

48 = 2 × 2 × 2 × 2 × 3
72 = 2 × 2 × 2 × 3 × 3
LCM = 2 × 2 × 2 × 2 × 3 × 3 = 144
∴ LCM of (48, 72) = 144

c. 22, 66

2	22
11	11
	1

2	66
3	33
11	11
	1

$22 = 2 \times 11$

$66 = 2 \times 11 \times 3$

$\therefore$ LCM of $(22, 66) = 2 \times 11 \times 3$

$= 66$

d. 36, 48, 96

2	36
2	18
3	9
3	3
	1

2	48
2	24
2	12
2	6
3	3
	1

2	96
2	48
2	24
2	12
2	6
3	3
	1

$36 = 2 \times 2 \times 3 \times 3$

$48 = 2 \times 2 \times 3 \times 2 \times 2$

$96 = 2 \times 2 \times 3 \times 2 \times 2 \times 2$

$\therefore$ LCM of $(36, 48, 96)$

$= 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 288$

e. 125, 180, 210

5	125
5	25
5	5
	1

2	180
2	90
3	45
3	15
5	5
	1

2	210
5	105
3	21
7	7
	1

$125 = \overline{5 \times 5 \times 5}$

$180 = \overline{2 \times 2} \times \overline{3 \times 3} \times 5$

$210 = 2 \times 5 \times 3 \times \overline{7}$

$\therefore$ LCM of $(125, 180, 210)$

$= 5 \times 5 \times 5 \times 3 \times 3 \times 2 \times 2 \times 7$

$= 31500$

f. 198, 216, 360

2	198
3	99
3	33
11	11
	1

2	216
2	108
2	54
3	27
3	9
3	3
	1

2	360
2	180
2	90
3	45
3	15
5	5
	1

$198 = 2 \times 3 \times 3 \times \overline{11}$

$216 = \overline{2 \times 2 \times 2} \times \overline{3 \times 3 \times 3}$

$360 = 2 \times 2 \times 2 \times 3 \times 3 \times \overline{5}$

$\therefore$ LCM of $(198, 216, 360)$

$= 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 11 \times 5$

$= 11880$

3. a. 20, 35, 45

5	20, 35, 45
2	4, 7, 9
2	2, 7, 9
7	1, 7, 9
3	1, 1, 9
3	1, 1, 3
	1, 1, 1

$\therefore$ LCM of $(20, 35, 45)$

$= 5 \times 2 \times 2 \times 7 \times 3 \times 3$

$= 1260$

b. 10, 25, 65

5	10, 25, 65
2	2, 5, 13
5	1, 5, 13
13	1, 1, 13
	1, 1, 1

$\therefore$ LCM of $(10, 25, 65)$

$= 5 \times 2 \times 5 \times 13$

$= 650$

c. 27, 45, 60, 72, 96

3	27, 45, 60, 72, 96
3	9, 15, 20, 24, 32
3	3, 5, 20, 8, 32
5	1, 5, 20, 8, 32
2	1, 1, 4, 8, 32
2	1, 1, 2, 4, 16
2	1, 1, 1, 2, 8
2	1, 1, 1, 1, 4
2	1, 1, 1, 1, 2
	1, 1, 1, 1, 1

$\therefore$ LCM of $(27, 45, 60, 72, 96)$

$= 3 \times 3 \times 3 \times 5 \times 2 \times 2 \times 2 \times 2 \times 2$

$= 4320$

d. 36, 64, 72, 96, 120

2	36, 64, 72, 96, 120
2	18, 32, 36, 48, 60
2	9, 16, 18, 24, 30
2	9, 8, 9, 12, 15
2	9, 4, 9, 6, 15
3	9, 2, 9, 3, 15
2	3, 2, 3, 1, 5
3	3, 1, 3, 1, 5
5	1, 1, 1, 1, 5
	1, 1, 1, 1, 1

$\therefore$ LCM of $(36, 64, 72, 96, 120)$

$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5$

$= 2880$

e. 42, 60, 84, 108

2	42, 60, 84, 108
2	21, 30, 42, 54
3	21, 15, 21, 27
3	7, 5, 7, 9
3	7, 5, 7, 3
7	7, 5, 7, 1
5	1, 5, 1, 1
	1, 1, 1, 1

∴ LCM of (42, 60, 84, 108)
= 2 × 2 × 3 × 3 × 3 × 5 × 7 = 3780

f. 135, 175

5	135, 175
3	27, 35
3	9, 35
3	3, 35
5	1, 35
7	1, 7
	1, 1

∴ LCM of (135, 175)
= 5 × 3 × 3 × 3 × 5 × 7 = 4725

g. 144, 120

2	144, 120
2	72, 60
2	36, 30
2	18, 15
3	9, 15
3	3, 5
5	1, 5
	1, 1

∴ LCM of (144, 120)
= 2 × 2 × 2 × 2 × 3 × 3 × 5
= 720

h. 162, 270, 108

2	162, 270, 108
3	81, 135, 54
3	27, 45, 18
3	9, 15, 6
3	3, 5, 2
5	1, 5, 2
2	1, 1, 2
	1, 1, 1

∴ LCM of (162, 270, 108)
= 2 × 3 × 3 × 3 × 3 × 5 × 2
= 1620

Exercise 6.6

1. LCM of 8, 15 and 24 = 120

2	8, 15, 24
2	4, 15, 12
3	2, 15, 6
2	2, 5, 2
5	1, 5, 1
	1, 1, 1

LCM = 2 × 2 × 3 × 2 × 5 = 120
Smallest number = 120

2. LCM of 18, 24 and 36 = 72

2	18, 24, 36
3	9, 12, 18
2	3, 4, 6
3	3, 2, 3
	1, 2, 1

∴ Required number
= 72 + 7 = 79

3. Similar working as Q. 2.

4. We will find the HCF of 27 and 33.

```
27 | 33 | 1
   - 27
     6 | 27 | 4
       -24
         3 | 6 | 2
           -6
            0
```

3 is the largest number which divides 27 and 33.

5. Similar working as in Q 4.

6. Find the HCF of 368, 480 and 536.

368 | 480 | 1
− 368
112 | 368 | 3
− 336
32 | 112 | 3
− 96
16 | 32 | 2
32
×

16 | 536 | 33
− 48
56
− 48
8 | 16 | 2
16
×

∴ HCF of 368, 480, 536 = 8

7. To find when bells will toll together, we need to find LCM of 9, 12 and 15.

3 | 9, 12, 15
3, 4, 5

LCM = 3 × 3 × 4 × 5 = 180

Bells will toll together after 180 seconds, i.e., 3 minutes.

8. Similar working as in Q 7.

9. 108 | 180 | 1
−108
72 | 108 | 1
−72
36 | 72 | 2
−72
×

HCF of 108 and 180 is 36.

Hence, 36 is the largest number of students among whom 108 chocolates and 180 cookies can be distributed equally.

Now to find the number of chocolates and cookies each students will get, divide the number of cookies and chocolates by 36.

i.e.,

Chocolates → 36 | 108 | 3
− 108
×

Cookies → 36 | 180 | 5
− 180
×

Hence each students will get 3 chocolates and 5 cookies.

10. 4 m 25 cm = 425 cm
5 m 50 cm = 550 cm
6 m = 600 cm

425 | 550 | 1
− 425
125 | 425 | 3
− 375
50 | 125 | 2
− 100
25 | 50 | 2
− 50
×

25 | 600 | 24
−50
100
−100
×

HCF of 425, 550 and 600 is 25.

Hence, 25 cm is the length of the longest tape that can be used to measure exactly the dimensions of the given hall.

11. ₹1 = 100 paise
∴ ₹1.25 = 125 paise
and ₹50 = 5000 paise
Now find the LCM of 125 and 5000.

5	125, 5000
5	25, 1000
5	5, 200
5	1, 40
8	1, 8
	1, 1

LCM of 125 and 5000 = 5 × 5 × 5 × 5 × 8 = 5,000
Amount in paise = 5,000
Amount in rupees
= 5,000 ÷ 100 = ₹50
The number of days
= ₹50 ÷ 1.25 = 40 days

Exercise 6.7

1. We know that
HCF × LCM = 1st number × 2nd number
∴ 5 × 280 = 35 × 2nd number
$\Rightarrow$ 2nd number = $\frac{5 \times 280}{35} = 40$

2. HCF × LCM = 1st number × 2nd number
∴ 3 × 120 = 15 × 2nd number
$\Rightarrow$ 2nd number = $\frac{3 \times 120}{15} = 24$

3. HCF × LCM = 1st number × 2nd number
∴ 6 × 180 = 36 × 2nd number
$\Rightarrow$ 2nd number = $\frac{6 \times 180}{36} = 30$

4. HCF × LCM = 1st number × 2nd number
∴ 27 × 2079 = 189 × 2nd number
$\Rightarrow$ 2nd number = $\frac{27 \times 2079}{189} = 297$

5. LCM × HCF = 12 × 64
∴ 192 × HCF = 12 × 64
$\Rightarrow$ HCF = $\frac{12 \times 64}{192} = 4$

6. HCF × LCM = Product of the numbers
∴ LCM × 6 = 432
$\Rightarrow$ LCM = $\frac{432}{6} = 72$

Test Your Skills

Multiple Choice Questions

1–5. Refer answers at the end of the book.

Mental Maths

1. 12th multiple of 15 = 12 × 15 = 180

2. 45 □ 782 = 4 + 5 + 7 + 8 + 2 = 26 + 1 = 27 is divisible by 3 and 45 □ 782 has 2 at its end digit. So 452782 is divisible by 6.

3. Refer answer at the end of the book.

4. LCM = $\frac{735}{7} = 105$

5. Odd numbers between 50 and 100 are 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99.

So, there are 25 odd numbers between 50 and 100.

Apply Your Skills

Problem Solving Assessment

1. LCM of 4 and 6 = 12

The number divisible by 12 = 39050 – 2 = 39048

390486 is divisible by 12 (both 4 and 6)

So, 2 is the required smallest number.

```
12 | 39050 | 3254
   – 36
   ----
     30
   – 24
   ----
     65
   – 60
   ----
     50
   – 48
   ----
      2
```

2. Distance = 100 km

Petrol pump is at a distance after every 15 km.

Number of petrol pumps = 100 ÷ 15 = 6

```
15 | 100 | 6
   –90
   ---
    10
```

Petrol pumps are at a distance of 15 km, 30 km, 45 km, 60 km, 75 km and 90 km.

3 petrol pumps are between 45 km and 100 km.

3. LCM of 15, 30 and 75 = 150 seconds

= 2 min 30 seconds

The lights will change at 8:02:30 am.

4. 1036 – 1 = 1035

347 – 2 = 345

633 – 3 = 630

Now find the HCF of 345, 630 and 1035.

```
345 | 630 | 1
    – 345
    -----
      285 | 345 | 1
          – 285
          -----
           60 | 285 | 4
              – 240
              -----
               45 | 60 | 1
                  – 45
                  ----
                  15 | 45 | 3
                     – 45
                     ----
                      ×
```

```
15 | 1035 | 69
   – 90
   ----
    135
   – 135
   -----
      ×
```

∴ 15 is the greatest number that divides 1036, 347 and 633 leaving remainders 1, 2 and 3 respectively.

Value Based Questions

1. To find the common room, we take the LCM of 4, 5 and 6.

LCM = 2 × 2 × 5 × 3 = 60

Multiples of 60 are 60, 120, 180 and 240.

Common rooms are numbered 120, 180 and 240. **Value:** Care for elders.

2. Amount kept to buy pens:

Shubham = ₹500 – 100 = ₹400, Pinky = ₹800 – 100 = ₹700

and Rahul = ₹1100 – 100 = ₹1000

To find the equal number of pens,
we need to find the HCF of 400, 700 and 1000.

```
400 | 700 | 1
  – 400
  300 | 400 | 1
      – 300
      100 | 300 | 3
          – 300
            ×
```

```
100 | 1000 | 10
    –100
       0
     – 0
       ×
```

HCF of 400, 700 and 1000 = 100

a. Each can buy 100 pens.

b. Shubham, as he has least money among the three and each pen costs ₹400 ÷ 100 = ₹4

c. **Value:** Care for poors.

3. HCF of 72 and 48 = 2 × 2 × 2 × 3 = 24

72 = 2 × 2 × 2 × 3 × 3

48 = 2 × 2 × 2 × 2 × 3

2 | 72
2 | 36
2 | 18
3 | 9
| 3

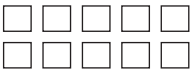
2 | 48
2 | 24
2 | 12
2 | 6
| 3

24 rows are possible if each number has the same number of plants.

Value: Health awareness

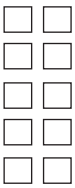
HOTS

1. 5 × 2



1 × 10

2 × 5



CHAPTER 7

Fractions

Lesson Plan

OBJECTIVES

The students should know about

(i) Fractions and its parts
(ii) Type of fractions
(iii) Equivalent fractions
(iv) Ascending and descending order of fractions
(v) Addition and subtraction of fractions
(vi) Degree of closeness of fractions
(vii) Word problems

Prerequisite Knowledge: The students should have the basic knowledge of numerator and denominator of a fraction and the type of fractions as they have studied in their previous classes.

Teaching Aids: Writing board, marker, chalks, chart, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following sub-topics of this chapter will be taught in the class taking some simple examples.

(i) **Fraction:** Having numerator in upper part and denominator in lower part.

For example, $\frac{3}{5}, \frac{5}{7}, \frac{2}{1}, \frac{3}{2}$, etc.

(ii) **Type of Fractions**

(a) **Simple fraction:** Numerator is less than the denominator, e.g., $\frac{2}{3}, \frac{5}{7}, \frac{2}{9}$, etc.
It is also known as proper fraction.

(b) **Improper fraction:** Numerator is greater than the denominator.

For example, $\frac{7}{2}, \frac{11}{5}, \frac{13}{3}$, etc.

(c) **Mixed fraction:** A combination of whole number and a proper fraction is called mixed fraction.

For example, $2\frac{2}{5}, 3\frac{1}{7}, 5\frac{8}{11}$, etc.

(iii) **Equivalent fractions:** Which represent the same value.

For example, $\frac{2}{3}, \frac{4}{6}, \frac{6}{9}$, etc.

Order of Fractions

For example

(iv) Arrange the fractions in ascending order

$$\frac{1}{2}, \frac{5}{6}, \frac{3}{4}$$

LCM of 2, 6 and 4 = 12

$$\therefore \quad \frac{1\times6}{2\times6}=\frac{6}{12}, \frac{5\times2}{6\times2}=\frac{10}{12}, \frac{3\times3}{4\times3}=\frac{9}{12}$$

So, the ascending order is $\frac{1}{2} < \frac{3}{4} < \frac{5}{6}$.

Recapitulation: The whole chapter will be revised in the class taking some easy examples and the problems of the students will be solved accordingly.

Home Assignments

(A) From Textbook

(i) Exercise 7.1—Solve Q. No. 1 and 2 all parts.
(ii) Exercise 7.2—Solve Q. No. 1 to 5 all parts.
(iii) Exercise 7.3—Solve Q. No. 1 to 3 all parts.
(iv) Exercise 7.4—Solve Q. No. 1 to 3 all parts.
(v) Exercise 7.5—Solve Q. No. 1 and 2 all parts.

(B) Extra Questions

(i) Simplify: $\frac{4}{5} + \frac{3}{4} - \frac{1}{2}$

(ii) Write in ascending order: $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$

(iii) Simplify: $\frac{2}{3} - \frac{4}{5} \times \frac{1}{2} + \frac{1}{3}$

Textbook Solutions

Exercise 7.1

1.–2. Refer answers at the end of the book.

3. a. $\frac{18}{7} = \text{Quotient } \frac{\text{Remainder}}{\text{Divisor}} = 2\frac{4}{7}$

$7\overline{)18}\,2$, -14, 4

b. $\frac{37}{6} = 6\frac{1}{6}$

$6\overline{)37}\,6$, -36, 1

c.–f. Similar working as above.

4. a. $2\frac{4}{5} = \frac{(2 \times 5) + 4}{5} = \frac{10 + 4}{5} = \frac{14}{5}$

b. $3\frac{7}{9} = \frac{(3 \times 9) + 7}{9} = \frac{27 + 7}{9} = \frac{34}{9}$

c. $5\frac{9}{10} = \frac{(5 \times 10) + 9}{10} = \frac{50 + 9}{10} = \frac{59}{10}$

d. $5\frac{1}{9} = \frac{(5 \times 9) + 1}{9} = \frac{45 + 1}{9} = \frac{46}{9}$

e. $1\frac{5}{8} = \frac{(1 \times 8) + 5}{8} = \frac{8 + 5}{8} = \frac{13}{8}$

f. $3\frac{3}{4} = \frac{(3 \times 4) + 3}{4} = \frac{12 + 3}{4} = \frac{15}{4}$

5. a. Fraction of the team played the match $= \frac{\text{No. of players allowed to play}}{\text{Total players}} = \frac{11}{16}$

b. i. Fraction of students like cricket $= \frac{12}{60}\left(\frac{\text{No. of students who like cricket}}{\text{Total number of students}}\right) = \frac{1}{5}$

ii. Fraction of students who like football $= \frac{48}{60} = \frac{4}{5}$ ($\because 60 - 12 = 48$)

Exercise 7.2

1. Equivalent fractions are obtained by multiplying the numerator and denominator of the given fraction by the same number.

a. $\frac{1\times4}{4\times4}=\frac{4}{16}$; $\frac{1\times5}{4\times5}=\frac{5}{20}$; $\frac{1\times6}{4\times6}=\frac{6}{24}$

b. $\frac{1\times4}{5\times4}=\frac{4}{20}$; $\frac{1\times5}{5\times5}=\frac{5}{25}$; $\frac{1\times6}{5\times6}=\frac{6}{30}$

c. $\frac{1\times4}{8\times4}=\frac{4}{32}$; $\frac{1\times5}{8\times5}=\frac{5}{40}$; $\frac{1\times6}{8\times6}=\frac{6}{48}$

d. $\frac{1\times4}{9\times4}=\frac{4}{36}$; $\frac{1\times5}{9\times5}=\frac{5}{45}$; $\frac{1\times6}{9\times6}=\frac{6}{54}$

2. Refer answers at the end of the book.

3. In like fractions, the fraction with greater numerator is greater.

a. $\frac{3}{8}\ominus\frac{5}{8}$ b. $\frac{11}{14}\oplus\frac{9}{14}$ c. $\frac{1}{2}\oplus\frac{1}{7}$

d. In a given pair of fractions, whose numerators are same, the fraction with greater denominator is smaller. $\therefore \frac{2}{7}\oplus\frac{2}{9}$

e. $\frac{4}{5}\times\frac{7}{8}$ $\Rightarrow 4\times8 \bigcirc 7\times5$ $\Rightarrow 32\ominus 35$ $\therefore \frac{4}{5}\ominus\frac{7}{8}$ f. $\frac{31}{45}\otimes\frac{31}{45}$

g. Since $\frac{\cancel{15}^{3}}{\cancel{55}_{11}}=\frac{3}{11}$ $\therefore \frac{15}{55}\otimes\frac{3}{11}$

h. Convert unlike fractions into like fractions by finding LCM of 9 and 12.

3	9, 12
3	3, 4
4	1, 4
1	1, 1

LCM $= 3\times3\times4$
$= 36$

Now $\frac{5}{9}=\frac{5\times4}{9\times4}=\frac{20}{36}$ and $\frac{5}{12}=\frac{5\times3}{12\times3}=\frac{15}{36}$

$\therefore \frac{20}{36}\oplus\frac{15}{36}$ or $\frac{5}{9}\oplus\frac{5}{12}$

4. a. LCM of 15 and 30 = 30

$\frac{13}{15}=\frac{13\times2}{15\times2}=\frac{26}{30}$

Yes, both the fractions are equivalent.

b. LCM of 6 and 54 = 54

$\frac{4}{6}=\frac{4\times9}{6\times9}=\frac{36}{54}$

Yes, both the fractions are equivalent.

c.–e. Similar working as above.

5. a. Equivalent fraction of $\frac{4}{11}$ with denominator $55=\frac{4}{11}\times\frac{5}{5}=\frac{20}{55}$

b., c. and d. Similar working as above.

6. a. Equivalent fraction of $\frac{84}{112}$ with numerator 21 = $\frac{84 \div 4}{112 \div 4} = \frac{21}{28}$.

7. a. Since the denominators are same, we arrange the numerator from smallest to greatest.

$\frac{1}{6} < \frac{2}{6} < \frac{4}{6} < \frac{5}{6}$

c. Since the numerators are same, we arrange the denominator from greatest to smallest.

$\frac{15}{38} < \frac{15}{34} < \frac{15}{26} < \frac{15}{22}$

e. LCM of 3, 4, 5 and 2 = $2 \times 3 \times 2 \times 5 = 60$

$2 \mid 3, 4, 5, 2$

$\quad\; 3, 2, 5, 1$

$\frac{2}{3} = \frac{2 \times 20}{3 \times 20} = \frac{40}{60'}$ $\frac{3}{4} = \frac{3 \times 15}{4 \times 15} = \frac{45}{60}$

$\frac{4}{5} = \frac{4 \times 12}{5 \times 12} = \frac{48}{60'}$ $\frac{1}{2} = \frac{1 \times 30}{2 \times 30} = \frac{30}{60}$ $\therefore \frac{30}{60} < \frac{40}{60} < \frac{45}{60} < \frac{48}{60'}$ i.e., $\frac{1}{2} < \frac{2}{3} < \frac{3}{4} < \frac{4}{5}$

b., d. and f. Similar working as above.

8. a. Since the denominators are same, we arrange the fraction from largest to smallest.

$\frac{13}{14} > \frac{11}{14} > \frac{9}{14} > \frac{3}{14}$

b. Since the numerators are same, we arrange the denominators from smallest to largest.

$\frac{10}{11} > \frac{10}{21} > \frac{10}{31} > \frac{10}{51}$

e. LCM of 4, 8, 16 and $24 = 2 \times 2 \times 2 \times 2 \times 3 = 48$

$2 \mid 4, 8, 16, 24$

$2 \mid 2, 4, 8, 12$

$2 \mid 1, 2, 4, 6$

$\quad\; 1, 2, 3$

$\frac{3}{4} = \frac{3 \times 12}{4 \times 12} = \frac{36}{48'}$ $\frac{5}{8} = \frac{5 \times 6}{8 \times 6} = \frac{30}{48}$

$\frac{11}{16} = \frac{11 \times 3}{16 \times 3} = \frac{33}{48'}$ $\frac{17}{24} = \frac{17 \times 2}{24 \times 2} = \frac{34}{48}$

$\frac{36}{48} > \frac{34}{48} > \frac{33}{48} > \frac{30}{48'}$ i.e., $\frac{3}{4} > \frac{17}{24} > \frac{11}{16} > \frac{5}{8}$

c., d., and f. Similar working as above.

9. Dividing 32 students in 4 equal groups, i.e., $32 \div 4 = 8$ students

3 groups of 8 students each include $3 \times 8 = 24$ students

Hence, 24 students are more than 10 years old and 8 students are less than 10 years old.

10. Tina jumped = $4\frac{7}{12}$ ft or $\frac{(4 \times 12) + 7}{12} = \frac{55}{12}$ ft

Mina jumped = $3\frac{1}{6}$ ft or $\frac{(3 \times 6) + 1}{6} = \frac{18 + 1}{6} = \frac{19}{6}$ ft

Changing both fractions into like fractions,

$\frac{19}{6} = \frac{19 \times 2}{6 \times 2} = \frac{38}{12}$ and $\frac{55}{12}$

Since $\frac{55}{12} > \frac{38}{12}$ or $4\frac{7}{12} > 3\frac{1}{6}$.

Hence, Tina jumped farther.

Alternative Method:

Since the whole number 4 is greater than 3.

$\therefore 4\frac{7}{12} > 3\frac{1}{6}$. Tina jumped farther.

Exercise 7.3

1. a. $\frac{3}{6}=\frac{3\div3}{6\div3}=\frac{1}{2}$ b. $\frac{2}{8}=\frac{2\div2}{8\div2}=\frac{1}{4}$ c. $\frac{14}{7}=\frac{14\div7}{7\div7}=2$

d. $\frac{25}{5}=\frac{25\div5}{5\div5}=5$ e. $\frac{10}{10}=\frac{10\div10}{10\div10}=1$ f. $\frac{16}{64}=\frac{16\div16}{64\div16}=\frac{1}{4}$

g. $\frac{30}{90}=\frac{30\div30}{90\div30}=\frac{1}{3}$ h. $\frac{49}{98}=\frac{49\div49}{98\div49}=\frac{1}{2}$

2. To reduce the fraction in lowest fraction, we divide the numerator and denominator by common factor. The process is continued till the common factor of numerator and denominator is 1.

a. $\frac{10}{15}=\frac{10\div5}{15\div5}=\frac{2}{3}$ b. $\frac{39}{65}=\frac{39\div13}{65\div13}=\frac{3}{5}$ c. $\frac{42}{56}=\frac{42\div7}{56\div7}=\frac{6\div2}{8\div2}=\frac{3}{4}$

d. $\frac{60}{96}=\frac{60\div6}{96\div6}=\frac{10\div2}{16\div2}=\frac{5}{8}$ e. $\frac{66}{99}=\frac{66\div11}{99\div11}=\frac{6\div3}{9\div3}=\frac{2}{3}$ f. $\frac{98}{126}=\frac{98\div14}{126\div14}=\frac{7}{9}$

g. $\frac{136}{340}=\frac{136\div4}{340\div4}=\frac{34\div17}{85\div17}=\frac{2}{5}$ h. $\frac{135}{216}=\frac{135\div3}{216\div3}=\frac{45\div9}{72\div9}=\frac{5}{8}$ i. $\frac{300}{480}=\frac{300\div10}{480\div10}=\frac{30\div6}{48\div6}=\frac{5}{8}$

3. a. $\frac{2}{4}=\frac{2\div2}{4\div2}=\frac{1}{2}$ b. $\frac{6}{20}=\frac{6\div2}{20\div2}=\frac{3}{10}$ c. $\frac{24}{72}=\frac{24\div8}{72\div8}=\frac{3\div3}{9\div3}=\frac{1}{3}$

d. $\frac{12}{16}=\frac{12\div4}{16\div4}=\frac{3}{4}$ e. $\frac{20}{25}=\frac{20\div5}{25\div5}=\frac{4}{5}$ f. $\frac{4}{16}=\frac{4\div4}{16\div4}=\frac{1}{4}$

Exercise 7.4

1. a. $7+\frac{3}{5}=7\frac{3}{5}$ b. $15+\frac{8}{9}=15\frac{8}{9}$

When we have like fractions, we simply add numerators, keeping the denominator same.

c. $\frac{5}{11}+\frac{3}{11}=\frac{5+3}{11}=\frac{8}{11}$ d. $\frac{8}{15}+\frac{7}{15}=\frac{8+7}{15}=\frac{15}{15}$ or 1

e. $\frac{5}{8}+\frac{13}{16}$

LCM of 8 and 16 = 16

$\frac{5}{8}\times\frac{2}{2}=\frac{10}{16}$ and $\frac{13}{16}=\frac{13\times1}{16\times1}=\frac{13}{16}$

$\Rightarrow \frac{10}{16}+\frac{13}{16}=\frac{10+13}{16}=\frac{13}{16}=1\frac{7}{16}$

2	8, 16
2	4, 8
2	2, 4
	1, 2

LCM = 2 × 2 × 2 × 2 = 16

f.–j. Similar working as above.

k. $\frac{4}{13}+\frac{2}{13}+\frac{5}{13}=\frac{4+2+5}{13}=\frac{11}{13}$

l. $\frac{7}{16}+\frac{5}{8}+\frac{1}{2}$

LCM of 16, 8 and 2 = 16

$\frac{7}{16}\times\frac{1}{1}=\frac{7}{16}$, $\frac{5}{8}\times\frac{2}{2}=\frac{10}{16}$,

$\frac{1}{2}\times\frac{8}{8}=\frac{8}{16}$

2	16, 8, 2
2	8, 4, 1
2	4, 2, 1
	2, 1, 1

LCM = 2 × 2 × 2 × 2 = 16

$\therefore \quad \frac{7}{16}+\frac{10}{16}+\frac{8}{16}=\frac{7+10+8}{16}=\frac{25}{16}=1\frac{9}{16}$

m.–n. Similar working as above

2. a. $2\frac{3}{5}+7=(2+7)+\frac{3}{5}=9+\frac{3}{5}=9\frac{3}{5}$ b. $6+4\frac{2}{9}=(6+4)+\frac{2}{9}=10+\frac{2}{9}=10\frac{2}{9}$

When denominators are not same, we change them into like fraction by LCM method.

c. $5\frac{1}{5}+\frac{3}{5}=5+\left(\frac{1}{5}+\frac{3}{5}\right)=5+\left(\frac{1+3}{5}\right)=5+\frac{4}{5}=5\frac{4}{5}$

d. $\frac{1}{3}+3\frac{2}{3}=\frac{1}{3}+3+\frac{2}{3}=\frac{1+9+2}{3}=\frac{12}{3}=4$

e. $8+7\frac{3}{4}=8+7+\frac{3}{4}=15+\frac{3}{4}=\frac{15\times4+3}{4}=\frac{63}{4}=15\frac{3}{4}$

f. $4\frac{5}{11}+\frac{7}{22}=4+\left(\frac{5}{11}+\frac{7}{22}\right)=4+\left(\frac{10+7}{22}\right)=4+\frac{17}{22}=4\frac{17}{22}$

g. $13\frac{2}{9}+8\frac{1}{6}=(13+8)+\left(\frac{2}{9}+\frac{1}{6}\right)$

Since LCM of 9 and 6 is 18. $\therefore \frac{1}{6}=\frac{1\times3}{6\times3}=\frac{3}{18}$ and $\frac{2}{9}=\frac{2\times2}{9\times2}=\frac{4}{18}$

Now $21+\left(\frac{4}{18}+\frac{3}{18}\right)=21+\frac{7}{18}=21\frac{7}{18}$

h. $7\frac{11}{15}+\frac{9}{25}=7+\left(\frac{55+27}{75}\right)=7+\frac{82}{75}=7+1\frac{7}{75}=(7+1)+\frac{7}{25}=8\frac{7}{75}$

3. a. Part of cake eaten by Satish $=\frac{4}{9}$

Part of cake eaten by his sister Anshu $=\frac{2}{9}$

Total part of the cake eaten $=\frac{4}{9}+\frac{2}{9}=\frac{4+2}{9}=\frac{6}{9}$

Changing $\frac{6}{9}$ into lowest form.

$\frac{6\div3}{9\div3}=\frac{2}{3}$ is the total part of the cake eaten.

b. Fraction of money spent on books $=\frac{1}{2}$

Fraction of money spent on snacks and drinks $=\frac{1}{4}$

Total fraction of money spent $=\frac{1}{2}+\frac{1}{4}$

LCM of 2 and 4 is 4 $\therefore \frac{1}{2}=\frac{1\times2}{2\times2}=\frac{2}{4}$

Now, $\frac{2}{4}+\frac{1}{4}=\frac{3}{4}$.

c. Part of book read on Monday $=\frac{4}{9}$

Part of book read on Tuesday $=\frac{2}{9}$

Part of book read on Wednesday $=\frac{1}{9}$

Part of the book finished reading $=\frac{4}{9}+\frac{2}{9}+\frac{1}{9}=\frac{4+2+1}{9}=\frac{7}{9}$

d. Weight of apples purchased = $2\frac{1}{2}$ kg

Weight of grapes purchased = $3\frac{1}{4}$ kg

Total weight of fruits purchased = $2\frac{1}{2} + 3\frac{1}{4}$

LCM of 2 and 4 is 4.

$\therefore \frac{1}{2} = \frac{1 \times 2}{2 \times 2} = \frac{2}{4}$

Now, $2\frac{2}{4} + 3\frac{1}{4} = (2+3) + \left(\frac{2}{4} + \frac{1}{4}\right) = 5 + \left(\frac{3}{4}\right) = 5\frac{3}{4}$ kg.

e. Distance jogged on Monday = $\frac{2}{3}$ km

Distance jogged on Tuesday = $\frac{1}{6}$ km

Distance jogged on Wednesday = $\frac{5}{9}$ km

Total distance jogged = $\left(\frac{2}{3} + \frac{1}{6} + \frac{5}{9}\right)$ km

$= \left(\frac{12+3+10}{18}\right) = \frac{25}{18}$ km $= 1\frac{7}{18}$ km

$\begin{array}{r|l} 3 & 3, 6, 9 \\ \hline & 1, 2, 3 \end{array}$

LCM of 3, 6 and 9 = 3 × 2 × 3 = 18

Exercise 7.5

1. a. $8 - \frac{5}{9}$

$\frac{8}{1} = \frac{8 \times 9}{1 \times 9} = \frac{72}{9}$

$\therefore \quad \frac{72}{9} - \frac{5}{9} = \frac{72-5}{9} = \frac{67}{9}$ or $7\frac{4}{9}$

b. $11 - \frac{5}{8} = \frac{88}{8} - \frac{5}{8}$ $\left(\text{as } \frac{11}{1} = \frac{11 \times 8}{1 \times 8} = \frac{88}{8}\right)$

$= \frac{83}{8}$ or $10\frac{3}{8}$

c. $\frac{7}{9} - \frac{4}{9}$

Since fractions are like fractions, we simply subtract the numerators and write the difference over the common denominator.

i.e., $\frac{7-4}{9} = \frac{3}{9}$ or $\frac{3 \div 3}{9 \div 3} = \frac{1}{3}$

d. $\frac{15}{17} - \frac{9}{17} = \frac{15-9}{17} = \frac{6}{17}$

e. $\frac{9}{14} - \frac{2}{7}$ or $\frac{9}{14} - \frac{4}{14} = \frac{9-4}{14} = \frac{5}{14}$ $\left[\because \frac{2}{7} = \frac{2 \times 2}{7 \times 2} = \frac{4}{14}\right]$

f.–g. Similar working as above.

h. $11 - 5\frac{5}{8}$ or $11 - \frac{45}{8}$

Here, $\frac{11}{1} = \frac{11 \times 8}{1 \times 8} = \frac{88}{8}$ $\quad \therefore \frac{88}{8} - \frac{45}{8} = \frac{88-45}{8} = \frac{43}{8}$ or $5\frac{3}{8}$

i. $14 - 6\frac{9}{11}$ or $14 - \frac{75}{11}$

Here, $\frac{14}{1} = \frac{14 \times 11}{1 \times 11} = \frac{154}{11}$

$\therefore \frac{154}{11} - \frac{75}{11} = \frac{154 - 75}{11} = \frac{79}{11}$ or $7\frac{2}{11}$

j. $2\frac{3}{4} - \frac{1}{4} = 2 + \left(\frac{3}{4} - \frac{1}{4}\right) = 2 + \left(\frac{3-1}{4}\right) = 2 + \frac{2}{4} = 2\frac{2}{4}$ or $2\frac{1}{2}$

k. $9\frac{12}{17} - 6\frac{5}{17}$

We subtract the whole number and fractions separately.

$= (9 - 6) + \left(\frac{12}{17} - \frac{5}{17}\right)$

$= 3 + \left(\frac{12-5}{17}\right) = 3 + \frac{7}{17}$ or $3\frac{7}{17}$

l. $8\frac{3}{9} - 6\frac{4}{5}$

Changing mixed numbers into improper fractions.

$8\frac{3}{9} = \frac{75}{9}$ and $6\frac{4}{5} = \frac{34}{5}$

LCM of 9 and 5 is 45.

$\therefore \frac{75 \times 5}{9 \times 5} = \frac{375}{45}$ and $\frac{34 \times 9}{5 \times 9} = \frac{306}{45}$

Now, $\frac{375}{45} - \frac{306}{45} = \frac{375 - 306}{45} = \frac{69}{45}$ or $1\frac{24}{45}$ or $1\frac{8}{15}$

m. $3\frac{7}{12} - 2\frac{4}{9}$

Changing into improper fractions.

$2\frac{4}{9} = \frac{22}{9}$ and $3\frac{7}{12} = \frac{43}{12}$

LCM of 9 and 12 is 36.

$\therefore \frac{22}{9} = \frac{22 \times 4}{9 \times 4} = \frac{88}{36}$ and $\frac{43}{12} = \frac{43 \times 3}{12 \times 3} = \frac{129}{36}$

Now, $\frac{129}{36} - \frac{88}{36} = \frac{129 - 88}{36} = \frac{41}{36}$ or $1\frac{5}{36}$

n. $7\frac{3}{4} - 3$ or $\frac{31}{4} - 3$

Here, $\frac{3}{1} = \frac{3 \times 4}{1 \times 4} = \frac{12}{4}$

$\therefore \frac{31}{4} - \frac{12}{4} = \frac{31 - 12}{4} = \frac{19}{4}$ or $4\frac{3}{4}$

2. a. Sohan ate $\frac{1}{5}$ of a cake and Mohan ate $\frac{1}{6}$ of a cake.

Comparing the two fractions,

$\frac{1}{5} \times \frac{1}{6} = 1 \times 6 > 1 \times 5$. Hence, $\frac{1}{5} > \frac{1}{6}$. Sohan ate more.

Changing fractions into equivalent fractions,

$\frac{1}{5} = \frac{1 \times 6}{5 \times 6} = \frac{6}{30}$ and $\frac{1}{6} = \frac{1 \times 5}{6 \times 5} = \frac{5}{30}$

Now, $\frac{6}{30} - \frac{5}{30} = \frac{6-5}{30} = \frac{1}{30}$

Sohan ate more by $\frac{1}{30}$ of the cake.

b. Fraction of pizza Rahul has $= \frac{2}{3}$

Fraction of pizza Abhay has $= \frac{1}{2}$

Changing into like fractions,

LCM of 3 and 2 = 6

$\therefore \quad \frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{4}{6}$ and $\frac{1}{2} = \frac{1 \times 3}{2 \times 3} = \frac{3}{6}$

Since $4 > 3$.

$\therefore \quad \frac{4}{6} > \frac{3}{6}$ $\therefore$ Rahul has more pizza.

(i) True (ii) False (iii) False

c. Total length of pipe $= 21\frac{3}{5}$ m or $\frac{108}{5}$ m.

Length of pipe cut off from it $= 15\frac{1}{10}$ m or $\frac{151}{10}$ m.

Remaining length of the pipe $= \left(\frac{108}{5} - \frac{151}{10}\right)$ m.

Changing into like fractions,

$\frac{108}{5} = \frac{108 \times 2}{5 \times 2} = \frac{216}{10}$

$\therefore \quad \left(\frac{216}{10} - \frac{151}{10}\right)$ m $= \left(\frac{216-151}{10}\right)$ m $= \frac{65}{10}$ m or $6\frac{5}{10}$ m or $6\frac{1}{2}$ m

d. $7\frac{1}{4} - 3\frac{4}{5} = \frac{29}{4} - \frac{19}{5}$

$= \frac{(29 \times 5) - (19 \times 4)}{4 \times 5}$

$= \frac{145 - 76}{20} = \frac{69}{20} = 3\frac{9}{20}$

$17\frac{1}{2} - 9\frac{1}{3} = \frac{35}{2} - \frac{28}{3}$

$= \frac{(35 \times 3) - (28 \times 2)}{2 \times 3}$

$= \frac{105 - 56}{6} = \frac{49}{6} = 8\frac{1}{6}$

Since $8 > 3$. $\therefore \quad 8\frac{1}{6} > 3\frac{9}{20}$

Hence, $17\frac{1}{2} - 9\frac{1}{3}$ is greater.

e. Fraction of black marbles $= \frac{1}{3}$

Fraction of white marbles $= \frac{1}{2}$

Fraction of marbles not green $= \frac{1}{3} + \frac{1}{2} = \frac{(1 \times 2) + (1 \times 3)}{3 \times 2} = \frac{2+3}{6} = \frac{5}{6}$

Fraction of green marbles $= 1 - \frac{5}{6} = \frac{1}{6}$

Exercise 7.6

1. a. Subtracting $\frac{1}{9}$ from $\frac{5}{9}$, i.e., $\frac{5}{9}-\frac{1}{9}=\frac{4}{9}$

Again subtracting $\frac{1}{9}$ from $\frac{4}{9}$.

i.e., $\frac{4}{9}-\frac{1}{9}=\frac{3}{9}$ or $\frac{1}{3}$

Hence, degree of closeness of $\frac{5}{9}$ to $\frac{1}{3}$ is 2.

b. Subtracting $\frac{1}{6}$ from $\frac{5}{6}$.

i.e., $\frac{5}{6}-\frac{1}{6}=\frac{4}{6}$

Again subtracting $\frac{1}{6}$ from $\frac{4}{6}$.

i.e., $\frac{4}{6}-\frac{1}{6}=\frac{3}{6}$

Hence, degree of closeness of $\frac{5}{6}$ to $\frac{3}{6}$ is 2.

c. Subtracting $\frac{1}{5}$ from $\frac{4}{5}$.

$\frac{4}{5}-\frac{1}{5}=\frac{4-1}{5}=\frac{3}{5}$

Again subtracting $\frac{1}{5}$ from $\frac{3}{5}$. $\Rightarrow$ $\frac{3}{5}-\frac{1}{5}=\frac{3-1}{5}=\frac{2}{5}$

Again subtracting $\frac{1}{5}$ from $\frac{2}{5}$. $\Rightarrow$ $\frac{2}{5}-\frac{1}{5}=\frac{1}{5}$

Hence, degree of closeness of $\frac{4}{5}$ to $\frac{1}{5}$ is 3.

d. Subtracting $\frac{1}{8}$ from $\frac{7}{8}$.

① ② ③ ④

$\frac{7}{8}-\frac{1}{8}\Rightarrow\frac{6}{8}-\frac{1}{8}\Rightarrow\frac{5}{8}\xrightarrow{-\frac{1}{8}}\frac{4}{8}\xrightarrow{-\frac{1}{8}}\frac{3}{8}$

Hence, degree of closeness of $\frac{7}{8}$ to $\frac{3}{8}$ is 4.

2. a. To find degree of closeness of $\frac{3}{8}$ to $\frac{1}{2}$.

Add $\frac{1}{8}$ to $\frac{3}{8}$, i.e., $\frac{3}{8}+\frac{1}{8}=\frac{4}{8}$ or $\frac{1}{2}$

Hence, degree of closeness of $\frac{3}{8}$ to $\frac{1}{2}$ is 1.

To find degree of closeness of $\frac{3}{8}$ to $\frac{1}{4}$.

Subtract $\frac{1}{8}$ from $\frac{3}{8}$.

i.e., $\frac{3}{8}-\frac{1}{8}=\frac{2}{8}$ or $\frac{1}{4}$

Hence, degree of closeness of $\frac{3}{8}$ to $\frac{1}{4}$ is 1.

As degree of closeness is same in both cases. $\therefore$ $\frac{3}{8}$ is equally closer to $\frac{1}{2}$ and $\frac{1}{4}$.

b. To find degree of closeness of $\frac{7}{16}$ to $\frac{1}{2}$, we add $\frac{1}{16}$ to $\frac{7}{16}$.

i.e., $\frac{7}{16}+\frac{1}{16}=\frac{8}{16}$ or $\frac{1}{2}$, hence it is 1.

To find degree of closeness (DOC) of $\frac{7}{16}$ to $\frac{1}{4}$, we subtract $\frac{1}{16}$ from $\frac{7}{16}$ i.e.,

$\frac{7}{16} - \frac{1}{16} \Rightarrow \frac{6}{16} \xrightarrow{-\frac{1}{16}} \frac{5}{16} \xrightarrow{-\frac{1}{16}} \frac{4}{16}$ or $\frac{1}{4}$

Hence, DOC is 3.

$\therefore$ We can say $\frac{7}{16}$ is closer to $\frac{1}{2}$ than to $\frac{1}{4}$.

c. To find DOC of $\frac{5}{12}$ to $\frac{1}{3}$, we subtract $\frac{1}{3}$ from $\frac{5}{12}$.

i.e., $\frac{5}{12} - \frac{1}{12} = \frac{4}{12}$ or $\frac{1}{3}$

Hence, DOC = 1.

To find the DOC of $\frac{5}{12}$ to $\frac{2}{3}$, we add $\frac{1}{12}$ to $\frac{5}{12}$.

i.e., $\frac{5}{12} + \frac{1}{12} \Rightarrow \frac{6}{12} \xrightarrow{+\frac{1}{12}} \frac{7}{12} \xrightarrow{+\frac{1}{12}} \frac{8}{12}$ or $\frac{2}{3}$

Hence, DOC is 3.

So, we can say that $\frac{5}{12}$ is closer to $\frac{1}{3}$ than to $\frac{2}{3}$.

d. To find DOC of $\frac{1}{6}$ to $\frac{1}{2}$, we add $\frac{1}{6}$ to $\frac{1}{6}$.

i.e., $\frac{1}{6} + \frac{1}{6} = \frac{2}{6} \xrightarrow{+\frac{1}{6}} \frac{3}{6}$ or $\frac{1}{2}$

Hence, degree of closeness is 2.

To find DOC of $\frac{1}{6}$ to $\frac{1}{3}$ we add $\frac{1}{6}$ to $\frac{1}{6}$.

i.e., $\frac{1}{6} + \frac{1}{6} = \frac{2}{6}$ or $\frac{1}{3}$

Hence, DOC is 1.

So, we can say that $\frac{1}{6}$ is closer to $\frac{1}{3}$ than to $\frac{1}{2}$.

Exercise 7.7

1. a. $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{1+1+1+1+1}{4} = \frac{5}{4}$ or $1\frac{1}{4}$

b. $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{1+1+1+1+1}{3} = \frac{5}{3}$ or $1\frac{2}{3}$

c. $\frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} + \frac{3}{5} = \frac{3+3+3+3+3}{5} = \frac{15}{5} = 3$

d. $\frac{5}{8} + \frac{5}{8} + \frac{5}{8} + \frac{5}{8} = \frac{5+5+5+5}{8} = \frac{20}{8} = 2\frac{4}{8}$ or $2\frac{1}{2}$

Exercise 7.8

1. a. $\frac{5}{6} \times 30 = 5 \times 5 = 25$

b. $\frac{6}{8} \times 32 = 6 \times 4 = 24$

c. $\frac{2}{9} \times 18 = 2 \times 2 = 4$

d. $\frac{1}{8} \times 40 = 5$

e. $\frac{3}{8} \times 7 = \frac{3 \times 7}{8} = \frac{21}{8}$ or $2\frac{5}{8}$

f. $\frac{2}{7} \times 8 = \frac{16}{7}$ or $2\frac{2}{7}$

g. $\frac{4}{7} \times 9 = \frac{4 \times 9}{7} = \frac{36}{7}$ or $5\frac{1}{7}$

h. $\frac{6}{5} \times 2 = \frac{6 \times 2}{5} = \frac{12}{5}$ or $2\frac{2}{5}$

2. a. 1 week = 7 days

$\therefore \quad \frac{1}{7}$ of a week $= \frac{1}{7} \times 7$ days = 1 day

b. Denominator = 14, Numerator = 1

Hence, fraction $= \frac{1}{14}$

c. Numerator = 5, Denominator = ?

Since the fractions is equivalent to $\frac{1}{14}$ $\quad \therefore \frac{1 \times 5}{14 \times 5} = \frac{5}{70}$

Hence, denominator = 70

d. Numerator = 1, Denominator = 4 × 1 = 4 (In case of numerator = 3, denominator = 4 × 3 = 12 which is not a 1-digit number)

Hence, fraction is $\frac{1}{4}$.

Exercise 7.9

1. a. $\frac{2}{3}$ of $5 = \frac{2}{3} \times 5 = \frac{10}{3} = 3\frac{1}{3}$

b. $\frac{3}{8}$ of $4 = \frac{3}{\cancel{8}_{2}} \times \cancel{4}^{1} = \frac{3}{2} = 1\frac{1}{2}$

c. $\frac{3}{4}$ of $12 = \frac{3}{\cancel{4}} \times \cancel{12}^{3} = 9$

d. $\frac{4}{5}$ of $10 = \frac{4}{\cancel{5}} \times \cancel{10}^{2} = 4 \times 2 = 8$

e. $\frac{16}{21}$ of $7 = \frac{16}{\cancel{21}_{3}} \times \cancel{7} = \frac{16}{3} = 5\frac{1}{3}$

f. $\frac{1}{10}$ of $10 = \frac{1}{\cancel{10}} \times \cancel{10} = 1$

2. a. $\frac{2}{5} \times \frac{1}{3} = \frac{2 \times 1}{5 \times 3} = \frac{2}{15}$

b. $\frac{\cancel{3}^{1}}{5} \times \frac{4}{\cancel{9}_{3}} = \frac{1 \times 4}{5 \times 3} = \frac{4}{15}$

c. $\frac{\cancel{5}^{1}}{6} \times \frac{7}{\cancel{10}_{2}} = \frac{7}{12}$

d. $\frac{\cancel{3}^{1}}{\cancel{11}} \times \frac{\cancel{22}^{2}}{\cancel{27}_{9}} = \frac{1 \times 2}{1 \times 9} = \frac{2}{9}$

e. $\frac{\cancel{11}^{1}}{\cancel{55}_{\cancel{11}_{1}}} \times \frac{\cancel{5}^{1}}{3} = \frac{1 \times 1}{1 \times 3} = \frac{1}{3}$

f., g. h. Similar working as above.

3. a. $7 \times 5\frac{1}{5} = 7 \times \frac{26}{5} = \frac{7 \times 26}{5} = \frac{182}{5}$ or $36\frac{2}{5}$

b. $12 \times 3\frac{3}{4} = \cancel{12}^{3} \times \frac{15}{\cancel{4}} = 3 \times 15 = 45$

c. $15 \times 3\frac{5}{6} = \cancel{15}^{5} \times \frac{23}{\cancel{6}_{2}} = \frac{5 \times 23}{2} = \frac{115}{2}$ or $57\frac{1}{2}$

d. $4\frac{3}{5} \times \frac{1}{2} = \frac{23}{5} \times \frac{1}{2} = \frac{23 \times 1}{5 \times 2} = \frac{23}{10}$ or $2\frac{3}{10}$

e. $2\frac{1}{3} \times \frac{7}{3} = \frac{7}{3} \times \frac{7}{3} = \frac{7 \times 7}{3 \times 3} = \frac{49}{9}$ or $5\frac{4}{9}$

f. $5\frac{2}{5} \times \frac{7}{9} = \frac{\cancel{27}^{3}}{5} \times \frac{7}{\cancel{9}_{1}} = \frac{3 \times 7}{5 \times 1} = \frac{21}{5}$ or $4\frac{1}{5}$

g. $3\frac{5}{9} \times 1\frac{3}{4} = \frac{\cancel{32}^{8}}{9} \times \frac{7}{\cancel{4}} = \frac{8 \times 7}{9} = \frac{56}{9}$ or $6\frac{2}{9}$

h. $4\frac{2}{6} \times 2\frac{5}{8} = 4\frac{1}{3} \times \frac{21}{8} \Rightarrow \frac{13}{\cancel{3}_{1}} \times \frac{\cancel{21}^{7}}{8} = \frac{13 \times 7}{1 \times 8} = \frac{91}{8}$ or $11\frac{3}{8}$

i. $6\frac{2}{5} \times 3\frac{5}{7} = \frac{32}{5} \times \frac{26}{7} = \frac{832}{35}$ or $23\frac{27}{35}$

j. $10\frac{2}{3} \times \frac{7}{8} = \frac{\cancel{32}^{4}}{3} \times \frac{7}{\cancel{8}_{1}} = \frac{4 \times 7}{3 \times 1} = \frac{28}{3}$ or $9\frac{1}{3}$

4. a. Total students = 50

Fraction of girls = $\frac{1}{5}$

Number of girl students = $\frac{1}{5}$ of 50

$= \frac{1}{\cancel{5}} \times \cancel{50}^{10} = 10$ girl students

b. Total number of pages = 250

Fraction of book read = $\frac{1}{5}$

$\therefore$ Number of pages read = $\frac{1}{5}$ of 250 = $\frac{1}{\cancel{5}} \times \cancel{250}^{50} = 50$ pages

Number of pages left = (250 – 50) pages = 200 pages

c. Sweets bought = $\frac{5}{8}$ of 1 kg = $\frac{5}{8}$ kg

Fraction of sweets Jessica ate = $\frac{1}{5}$

$\therefore$ Amount of sweets she ate = $\frac{1}{5}$ of $\frac{5}{8}$ kg = $\frac{1}{5} \times \frac{5}{8} = \frac{1}{8}$

$= \frac{1000}{8}$ g = 125 g

d. Earning in a month = ₹10,000

Fraction spent on house rent = $\frac{1}{5}$

$\therefore$ Money spent on house rent = $\frac{1}{5}$ of ₹10,000 = $\frac{1}{\cancel{5}} \times \cancel{10,000}^{2000} =$ ₹2,000

Fraction of earning spent on personal expenses = $\frac{1}{2}$

Money spent on personal expenses = $\frac{1}{2}$ of ₹10,000

$= \frac{1}{\cancel{2}} \times \cancel{10,000}^{5000} = ₹5,000$

e. Perimeter of park = $2\frac{1}{3}$ km or $\frac{7}{3}$ km

Number of rounds taken = 3

Total distance run by the boy = $\left(\frac{7}{\cancel{3}} \times \cancel{3}^{1}\right) = 7$ km

f. Number of bags received = 112

Fraction of bags containing vegetables = $\frac{1}{2}$

∴ Number of vegetables bags = $\frac{1}{2}$ of 112 = $\frac{1}{\cancel{2}} \times \cancel{112}^{56} = 56$ bags

Fraction of potatoes in vegetable bag = $\frac{1}{7}$

Number of potato bags = $\frac{1}{7}$ of 56 = $\frac{1}{\cancel{7}} \times \cancel{56}^{8} = 8$ bags

Exercise 7.10

1. a. $\frac{9}{4}$ b. $\frac{15}{12}$ or $\frac{5}{4}$ c. $\frac{29}{13}$ d. 14 e. $\frac{3}{25}$ f. $\frac{5}{49}$

2. a. MI of 6 is $\frac{1}{6}$ b. MI of 100 is $\frac{1}{100}$. c. MI of $\frac{9}{4}$ is $\frac{4}{9}$.

d. MI is $\frac{4}{9}$. e. $2\frac{1}{3} = \frac{7}{3}$. Hence Multiplicative Inverse (MI) of $\frac{7}{3}$ is $\frac{3}{7}$.

f. $1\frac{1}{2} \times 3\frac{1}{5} = \frac{3}{\cancel{2}_{1}} \times \frac{\cancel{16}^{8}}{5} = \frac{3 \times 8}{1 \times 5} = \frac{24}{5}$ ∴ MI of $\frac{24}{5}$ is $\frac{5}{24}$.

g. $2\frac{2}{3} \times 4\frac{2}{7} = \frac{8}{\cancel{3}_{1}} \times \frac{\cancel{30}^{10}}{7} = \frac{80}{7}$ ∴ MI of $\frac{80}{7}$ is $\frac{7}{80}$.

h. $9\frac{2}{3} \times 4\frac{1}{3} = \frac{29}{3} \times \frac{13}{3} = \frac{377}{9}$. Hence, MI of $\frac{377}{9}$ is $\frac{9}{377}$.

Exercise 7.11

1. a. $1 - \frac{1}{2} = \frac{1}{2}$ $\frac{1}{2} - \frac{1}{2} = 0$

We have successively subtracted $\frac{1}{2}$ from 1 and 2 time.

∴ $1 \div \frac{1}{2} = 2 \Rightarrow 1 \times 2 = 2$

b. $1 - \frac{1}{3} = \frac{2}{3}$ …① $\frac{2}{3} - \frac{1}{3} = \frac{1}{3}$ …② $\frac{1}{3} - \frac{1}{3} = 0$ …③

∴ $1 \div \frac{1}{3} = 3$ or $1 \times 3 = 3$

c. $2 - \frac{1}{2} = 1\frac{1}{2}$ …① $1\frac{1}{2} - \frac{1}{2} = 1$ …②

$1-\frac{1}{2}=\frac{1}{2}$ …③ $\frac{1}{2}-\frac{1}{2}=0$ …④

Hence, $2\div\frac{1}{2}=4$ or $2\times 2=4$.

d., e. and f. are done in the same manner.

2. a. Repeatedly subtracting $\frac{1}{4}$ from 4, we get

$4-\frac{1}{4}=3\frac{3}{4} \Rightarrow 3\frac{3}{4}-\frac{1}{4}=3\frac{2}{4} \Rightarrow 3\frac{2}{4}-\frac{1}{4}=3\frac{1}{4} \Rightarrow 3\frac{1}{4}-\frac{1}{4}=3$

$3-\frac{1}{4}=2\frac{3}{4} \Rightarrow 2\frac{3}{4}-\frac{1}{4}=2\frac{2}{4} \Rightarrow 2\frac{2}{4}-\frac{1}{4}=2\frac{1}{4} \Rightarrow 2\frac{1}{4}-\frac{1}{4}=2$

$2-\frac{1}{4}=1\frac{3}{4} \Rightarrow 1\frac{3}{4}-\frac{1}{4}=1\frac{2}{4} \Rightarrow 1\frac{2}{4}-\frac{1}{4}=1\frac{1}{4} \Rightarrow 1\frac{1}{4}-\frac{1}{4}=1$

$1-\frac{1}{4}=\frac{3}{4} \Rightarrow \frac{3}{4}-\frac{1}{4}=\frac{2}{4} \Rightarrow \frac{2}{4}-\frac{1}{4}=\frac{1}{4} \Rightarrow \frac{1}{4}-\frac{1}{4}=0$

We have successively subtracted $\frac{1}{4}$ from 4, i.e., 16 times.

$\therefore \quad 4\div\frac{1}{4}=16$

b. Repeatedly subtracting $\frac{1}{3}$ from 3, we get

$3-\frac{1}{3}=2\frac{2}{3} \Rightarrow 2\frac{2}{3}-\frac{1}{3}=2\frac{1}{3} \Rightarrow 2\frac{1}{3}-\frac{1}{3}=2$

$2-\frac{1}{3}=1\frac{2}{3} \Rightarrow 1\frac{2}{3}-\frac{1}{3}=1\frac{1}{3} \Rightarrow 1\frac{1}{3}-\frac{1}{3}=1$

$1-\frac{1}{3}=\frac{2}{3} \Rightarrow \frac{2}{3}-\frac{1}{3}=\frac{1}{3} \Rightarrow \frac{1}{3}-\frac{1}{3}=0$

We have successively subtracted $\frac{1}{3}$ from 3, i.e., 9 times.

$\therefore \quad 3\div\frac{1}{3}=9$

c. and d. Similar working as above.

Exercise 7.12

1. a. $\frac{1}{2}\div 3=\frac{1}{2}\times\frac{1}{3}=\frac{1\times 1}{2\times 3}=\frac{1}{6}$ ($\because$ reciprocal of 3 is $\frac{1}{3}$)

b. $\frac{9}{10}\div 19=\frac{9}{10}\times\frac{1}{19}=\frac{9\times 1}{10\times 19}=\frac{9}{190}$

c. $\frac{3}{8}\div 6=\frac{\cancel{3}^{1}}{8}\times\frac{1}{\cancel{6}_{2}}=\frac{1}{16}$

d. $12\div\frac{4}{5}=\cancel{12}^{3}\times\frac{5}{\cancel{4}}=3\times 5=15$

e. $24\div\frac{10}{13}=\cancel{24}^{12}\times\frac{13}{\cancel{10}_{5}}=\frac{12\times 13}{5}=\frac{156}{5}$

f. $\frac{5}{8}\div\frac{7}{9}=\frac{5}{8}\times\frac{9}{7}=\frac{45}{56}$

g. $\frac{11}{12}\div\frac{3}{4}=\frac{11}{\cancel{12}_{3}}\times\frac{\cancel{4}^{1}}{3}=\frac{11}{9}=1\frac{2}{9}$

h. $\frac{24}{25}\div\frac{5}{12}=\frac{24}{25}\times\frac{12}{5}=\frac{288}{125}=2\frac{38}{125}$

i. $\frac{36}{45}\div\frac{8}{15}=\frac{\cancel{36}^{3}}{\cancel{45}_{3}}\times\frac{\cancel{15}}{\cancel{8}_{2}}=\frac{3\times 1}{1\times 2}=\frac{3}{2}$

j $\frac{27}{55}\div\frac{81}{85}=\frac{\cancel{27}^{3}}{\cancel{55}_{11}}\times\frac{\cancel{85}^{17}}{\cancel{81}_{9}}=\frac{3\times 17}{11\times 9}=\frac{51}{99}$ or $\frac{17}{33}$

k. $5\frac{1}{10} \div 16 = \frac{51}{10} \times \frac{1}{16} = \frac{51}{160}$

l. $3\frac{2}{3} \div 6 = \frac{11}{3} \times \frac{1}{6} = \frac{11}{18}$

m. $2\frac{1}{4} \div \frac{6}{7} = \frac{\cancel{9}^{3}}{4} \times \frac{7}{\cancel{6}_{2}} = \frac{3 \times 7}{4 \times 2} = \frac{21}{8}$ or $2\frac{5}{8}$

n. $4\frac{4}{5} \div \frac{7}{15} = \frac{24}{\cancel{5}} \times \frac{\cancel{15}^{3}}{7} = \frac{72}{7} = 10\frac{2}{7}$

o. $12\frac{3}{4} \div \frac{3}{12} = \frac{^{17}\cancel{51}}{_{1}\cancel{4}} \times \frac{\cancel{12}^{3}}{\cancel{3}_{1}} = 17 \times 3 = 51$

p. $4\frac{1}{4} \div 4\frac{3}{8} = \frac{17}{\cancel{4}} \times \frac{\cancel{8}^{2}}{35} = \frac{34}{35}$

q. $2\frac{3}{16} \div 5\frac{5}{8} = \frac{^{7}\cancel{35}}{_{2}\cancel{16}} \times \frac{\cancel{8}^{1}}{\cancel{45}_{9}} = \frac{7}{18}$

r. $17\frac{3}{7} \div 4\frac{5}{14} = \frac{^{2}\cancel{122}}{_{1}\cancel{7}} \times \frac{\cancel{14}^{2}}{\cancel{61}_{1}} = 2 \times 2 = 4$

2. a. Total sugar = 15 kg

Sugar in 1 packet = $\frac{1}{7}$ of $15 = \frac{1}{7} \times 15 = \frac{15}{7}$

Number of packets = $15 \div \frac{15}{7} = \cancel{15} \times \frac{7}{\cancel{15}} = 7$

b. $\frac{4}{9}$ of the distance covered in 8 minutes.

Total time taken to reach the house $= \left(8 \div \frac{4}{9}\right)$ minutes

$= {}^{2}\cancel{8} \times \frac{9}{\cancel{4}} = 18$ minutes

c. Sweets distributed to 5 children = $\frac{1}{4}$kg $= \frac{1000}{4} = 250$ g

Each child will get $= \left(250 \div 5\right)$ g $= {}^{50}\cancel{250} \times \frac{1}{\cancel{5}} = 50$ g

d. $\left(\frac{3}{12} \div \frac{9}{84}\right) \times \frac{9}{14} = \left(\frac{\cancel{3}}{\cancel{12}} \times \frac{\cancel{84}^{7}}{\cancel{9}_{3}}\right) \times \frac{9}{14} = \frac{\cancel{7}}{\cancel{3}} \times \frac{\cancel{9}^{3}}{\cancel{14}_{2}} = \frac{3}{2} = 1\frac{1}{2}$

e. ₹1 = 100 paise $\quad \therefore$ ₹3.50 = 3.50 paise ₹10 = 1000 paise

Hence, the fraction is $\frac{\cancel{350}^{7}}{\cancel{1000}_{20}} = \frac{7}{20}$.

f. Cost of $6\frac{2}{3}$ kg of rice = ₹$24\frac{2}{3}$ or ₹$\frac{74}{3}$

Cost of 1 kg of rice $= ₹\left(\frac{74}{3} \div 6\frac{2}{3}\right) = ₹\left(\frac{\cancel{74}^{37}}{\cancel{3}} \times \frac{\cancel{3}}{\cancel{20}_{10}}\right)$

$= ₹\frac{37}{10}$ or ₹$3\frac{7}{10}$

Test Your Skills

Multiple Choice Questions

1.–5. Refer answers at the end of the book.

Riddles

1. Total pizzas eaten $= 3\frac{3}{4} + 8\frac{3}{4} = \frac{15}{4} + \frac{35}{4}$

$= \frac{50}{4} = \frac{25}{2} = 12\frac{1}{2}$ pizzas

2. $2\frac{1}{2} - \frac{1}{2} \Rightarrow 2 - \frac{1}{2} \Rightarrow 1\frac{1}{2} - \frac{1}{2} \Rightarrow 1 - \frac{1}{2} \Rightarrow \frac{1}{2} - \frac{1}{2} = 0 \quad \Rightarrow 5$ times

① ② ③ ④ ⑤

3. Quantity of flours in $2\frac{1}{4}$ grams $= \frac{9}{4} \times 1000$ mg $= 2250$ mg

$\frac{1}{3}$ cups of flour $= 2250 \times \frac{1}{3} = 2250 \div 3 = 750$ mg

Apply Your Skills

Problem Solving Assessment

1. Fractions representing green $= \frac{\cancel{4}^{1}}{\cancel{20}_{5}} = \frac{1}{5}$, blue $= \frac{1\cancel{0}}{2\cancel{0}} = \frac{1}{2}$, red $= \frac{20 - 4 - 10}{20} = \frac{\cancel{6}^{3}}{\cancel{20}_{10}} = \frac{3}{10}$

Fractions of the balls representing geen, blue and red are $\frac{1}{5}, \frac{1}{2}, \frac{3}{10}$ respectively.

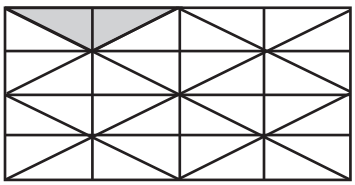
Fractions from greatest to smallest $= \frac{1}{2}, \frac{3}{10}, \frac{1}{5}$

2. Cloth left $= 9\frac{3}{16} - \left(2\frac{1}{2} + 4\frac{1}{4}\right) = \frac{147}{16} - \left(\frac{5}{2} + \frac{17}{4}\right)$

$= \frac{147}{16} - \frac{27}{4} = \frac{147 - 108}{16} = \frac{39}{16} = 2\frac{7}{16}$ m

3. Refer answers at the end of the book.

4. First complete the figure. Now, fraction of shaded part $= \frac{2}{32}$ or $\frac{1}{16}$



Value Based Questions

1. Chocolate distributed $= \frac{1}{2} + \frac{1}{8} + \frac{1}{4} = \frac{4 + 1 + 2}{8} = \frac{7}{8}$

Chocolate left $= 1$ (whole) $- \frac{7}{8} = \frac{8 - 7}{8} = \frac{1}{8}$

$\frac{\text{Number of chocolates}}{8} = 24$

or, Number of chocolates bought $= 24 \times 8 = 192$; **Value:** Social values

2. Number of packets $= 16 \times 4 = 64$ packets

(4 one-fourth make 1 kg, so 64 one-fourth make 16 kg.)

Number of plants in the garden $= 64 \times 8 = 512$ plants; **Value:** Care for nature

HOTS

1. a. Son's share = $\frac{1}{5} \times 20 = 4$ camels

b. Daughter's share = $\frac{1}{4} \times 20 = 5$ camels

c. Wife's share = $\frac{1}{\cancel{4}} \times \cancel{20}^{5} = 5$ camels

Thus, 4 + 5 + 5 = 14 camels are distributed and 8 camels are left with Setu.

Mental Maths

1. $\frac{2 \times 2}{3 \times 2} = \frac{4}{6}$

2. Fraction = $\frac{2+3}{4 \times 5} = \frac{5}{20}$

3. Fraction = $\frac{3}{2} - \frac{2}{3} = \frac{9-4}{6} = \frac{5}{6}$.

4. Smallest twin primes are 3 and 5.

$\frac{3+1}{5+1} = \frac{4}{6} = \frac{2}{3}$. So, fraction is to be $\frac{3}{5}$.

$$\begin{array}{r|l} 4 & 4, 5 \\ \hline 5 & 1, 5 \\ \hline & 1 \end{array}$$

5. 1 week = 7 days = 7 × 24 hours = 7 × 24 × 60 minutes = 7 × 24 × 60 × 60 seconds

$\frac{1}{\cancel{60}} \times \frac{1}{\cancel{60}} \times \frac{1}{\cancel{7}} \times \cancel{7} \times 24 \times \cancel{60} \times \cancel{60} = 24$ seconds

CHAPTER 8

Decimals and Percentage

Lesson Plan

OBJECTIVES

The students should know about

(i) Decimals and parts	(ii) Decimals on place value chart
(iii) Fractions to decimals	(iv) Decimals to fractions
(v) Like and unlike decimals	(vi) Equivalent decimals
(vii) Ordering of decimals	(viii) Operation on decimals
(ix) Word problems	(x) Applications of decimals

Prerequisite Knowledge: The students should have the basic knowledge of decimals as they have already studied in their previous classes.

Teaching Aids: Writing board, marker, chalks, charts, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics and subtopics of this chapter will be taught in the class.

(i) $\frac{1}{10}$ = one-tenth part = 0.1

$\frac{1}{100}$ = one-hundredth part = 0.01

$\frac{1}{1000}$ = one-thousandth part = 0.001

(ii) **Decimals on place value chart**

	Th	H	T	O	·	t	h th
(1000)	1	0	0	0	·	0	
(100)		1	0	0	·	0	
(10)			1	0	·	0	
(1)				1	·	0	

(iii) **Expanded form**

$$28.49 = 20 + 8 + \frac{4}{10} + \frac{9}{100}$$

(iv) **Fraction to decimals**

$$\frac{3}{2} = \frac{3}{2} \times \frac{5}{5} = \frac{15}{10} = 1.5$$

$$\frac{7}{8} = \frac{7}{8} \times \frac{125}{125} = \frac{875}{1000} = 0.875$$

(v) Addition, subtraction, multiplication and division of decimals will be explained on the board by taking some examples.

Recapitulation: The whole chapter will be revised in the class by involving the students and the problems of the students will be solved immediately.

Home Assignments

(A) From Textbook

(i) Exercise 8.1—Solve Q. No. 1 to 4 all parts.

(ii) Exercise 8.3—Solve Q. No. 1 to 4 all parts.

(iii) Exercise 8.6—Solve Q. No. 1 to 2 all parts.

(iv) Exercise 8.7—Solve Q. No. 1 to 3 all parts.

(B) Extra Questions

(i) Write the following decimals in expanded form.

(a) 38.126 (b) 57.023 (c) 116.161

(ii) Find the quotient.

(a) 56.64 ÷ 2 (b) 35.75 ÷ 5 (c) 216.38 ÷ 2

Textbook Solutions

Exercise 8.1

1.–5. Refer answers at the end of the book.

Exercise 8.2

1. a. $\frac{7}{100} = 0.07$

b. $7\frac{3}{10} = 7 + \frac{3}{10} = 7 + 0.3 = 7.3$

c. $4\frac{7}{100} = 4 + 0.07 = 4.07$

d. $12\frac{3}{1000} = 12 + 0.003 = 12.003$

e. $\frac{4}{5} = \frac{4 \times 2}{5 \times 2} = \frac{8}{10} = 0.8$

f. $\frac{14}{25} = \frac{14 \times 4}{25 \times 4} = \frac{56}{100} = 0.56$

g. $\frac{21}{50} = \frac{21 \times 2}{50 \times 2} = \frac{42}{100} = 0.42$

h. $\frac{8}{125} = \frac{8 \times 8}{125 \times 8} = \frac{64}{1000} = 0.064$

i. $\frac{13}{2} = \frac{13 \times 5}{2 \times 5} = \frac{65}{10} = 6.5$

j. $11\frac{1}{4} = 11 + \frac{1 \times 25}{4 \times 25} = 11.25$

k. $7\frac{2}{5} = 7 + \frac{2 \times 2}{5 \times 2} = 7 + \frac{4}{10} = 7.4$

l. $3\frac{1}{8} = 3 + \frac{1 \times 125}{8 \times 125} = 3 + \frac{125}{1000} = 3.125$

2. a. $0.4 = 0 + \frac{\cancel{4}^{2}}{\cancel{10}_{5}} = \frac{2}{5}$

b. $3.5 = 3 + \frac{\cancel{5}^{1}}{\cancel{10}_{2}} = 3 + \frac{1}{2}$ or $3\frac{1}{2}$

c. $0.19 = 0 + \frac{19}{100} = \frac{19}{100}$

d. $3.21 = 3 + \frac{21}{100}$ or $3\frac{21}{100}$

e. $65.34 = 65 + \frac{\cancel{34}^{17}}{\cancel{100}_{50}} = 65\frac{17}{50}$

f–h. Similar working as above.

i. $7.101 = 7 + \frac{101}{1000}$ or $7\frac{101}{1000}$

j. $78.191 = 78 + \frac{191}{1000} = 78\frac{191}{1000}$

Exercise 8.3

1. Decimals having equal number of decimal places are called like decimals.

a. (3.45, 141.01); (18.3, 39.9)

b. (12.15, 3.75); (144.632, 0.149)

c. (8.43, 119.87); (16.009, 8.114)

d. (115.125, 5.689); (8.5, 195.8)

2. In order to convert a group of decimals into like decimals, we make the number of digits to the right of decimal point in all of them same by adding required number of zeros. This is done as adding any number of zeros after the extreme right digit in the decimal number does not make any change to its value.

a. Since 11.738 has maximum 3 decimal places.
∴ the required like decimals are: 11.500, 11.738, 512.510

b. Since 39.118 has maximum 3 decimal places.
∴ the required like decimals are: 745.090, 39.118, 12.800

c. Since 0.489 has maximum 3 decimal places.
∴ the required like decimals are: 81.500, 394.260, 0.489

d. Since 30.623 has maximum 3 decimal places.
∴ the required like decimals are: 346.620, 439.100, 30.623

3. Since adding any number of zeros after the extreme right digit in the decimal number does not make any change to its value.
   ∴ The equivalent fractions are:
   a. 6.7 = 6.700 b. 10.01 = 10.010 c. 144.89 = 144.890
4. a. 6.5 → The equivalent fractions are 6.50, 6.500
   b. 11.80 → The equivalent fractions are 11.8, 11.800
   c. 91.700 → The equivalent fractions are 91.70, 91.7
   d. 51.4 → The equivalent fractions are 51.40, 51.400

Exercise 8.4

1. a. 37.17 < 37.7 (digit at tenth place is greater)
   b. 144.2 > 87.489 (In whole number part, 144 > 87)
   c. 75.5 = 75.500 (equivalent fraction)
   d. 8.345 < 80.45 (as 8 < 80 in whole part)
   e. 78.190 < 87.91 (digit at tens place, 7 < 8)
   f. 197.1 > 97.95 (reason same as in b)
2. a. Lowest = 4.350 (4 being the lowest whole number)
      Highest = 453.0 (greatest digit in tens place)
   b. Lowest = 146.267
      Highest = 1764.26
   c. Lowest = 271.414 (minimum digits on left side of decimal)
      Highest = 27141.4 (maximum digits on left side of decimal)
   d. Lowest = 46.24781 (same reason as above)
      Highest = 4781.426
3. By comparing the digits one by one, the ascending order will be:
   a. 8.06 < 8.60 < 80.6 < 86.0
   b. 44.76 < 46.47 < 46.74 < 47.64
   c. 9.0671 < 90.671 < 96.071 < 97.601
   d. 152.673 < 152.763 < 156.724 < 157.624
4. By comparing the digits one by one, the descending order will be:
   a. 60.68 > 60.08 > 6.80 > 6.008
   b. 590.35 > 559.03 > 553.09 > 550.93
   c. 461.23 > 46.123 > 42.163 > 41.623
   d. 54.448 > 54.442 > 54.440 > 54.404

Exercise 8.5

1. Write or arrange the numbers with decimal points below one another.

   a. $\begin{array}{r} 27.1 \\ +0.3 \\ \hline 27.4 \end{array}$ b. $\begin{array}{r} 42.86 \\ +20.13 \\ \hline 62.99 \end{array}$ c. $\begin{array}{r} 157.241 \\ +\ 23.420 \\ \hline 180.661 \end{array}$ d. $\begin{array}{r} 46.401 \\ +322.128 \\ \hline 368.529 \end{array}$

   e. $\begin{array}{r} {\scriptstyle 1\ 1\ 1} \\ 812.369 \\ +\ 00.771 \\ \hline 813.140 \end{array}$ f. $\begin{array}{r} 216.600 \\ 0.004 \\ +\ 4.681 \\ \hline 221.285 \end{array}$ g. $\begin{array}{r} 164.12 \\ 14.00 \\ +\ 123.71 \\ \hline 301.83 \end{array}$ h. $\begin{array}{r} {\scriptstyle 1\ 1\ 1} \\ 28.074 \\ 0.660 \\ +15.445 \\ \hline 44.179 \end{array}$

2. Numbers are put in columns with the larger number on top and the decimal point. Underneath are another empty place values are filled with zeros so that all the number have same number of decimal places.

a. $\begin{array}{r} 7.6 \\ -1.4 \\ \hline 6.2 \end{array}$ b. $\begin{array}{r} 1.25 \\ -0.10 \\ \hline 1.15 \end{array}$ c. $\begin{array}{r} 27.58 \\ -\ \ 0.22 \\ \hline 27.36 \end{array}$ d. $\begin{array}{r} {\scriptstyle 3\ 9\ \ 9\ 10} \\ 240.00 \\ -201.54 \\ \hline 38.46 \end{array}$

e. $\begin{array}{r} 12.993 \\ -\ \ 2.280 \\ \hline 10.713 \end{array}$ f. $\begin{array}{r} {\scriptstyle 1\ \ 10\,16\,10} \\ 12.170 \\ -\ \ 1.387 \\ \hline 10.783 \end{array}$ g. $\begin{array}{r} {\scriptstyle 4\ \ 15} \\ 115.55 \\ -111.62 \\ \hline 003.93 \end{array}$ h. $\begin{array}{r} {\scriptstyle 6\ \ 9\ 9\ 10} \\ 37.000 \\ -\ \ 0.031 \\ \hline 36.969 \end{array}$

Exercise 8.6

1. • When a decimal is multiplied by 10, the decimal point is shifted by 1 place to the right.

• When a decimal is multiplied by 100, the decimal point is shifted by 2 places to the right.

a. 4.79 × 10 = 47.9 b. 39.145 × 10 = 391.45 c. 82.483 × 100 = 8248.3

d. 0.65 × 100 = 65 e. 114.01 × 100 = 11401.0

f. 345.19 × 1000 = 345190 (since the number of decimal place is only 3 we add a zero)

g. 436.385 × 1000 = 436385 h. 0.008 × 1000 = 8

i. 2.16 × 80 = 2.16 × 8 × 10 = 17.28 × 10 = 172.8

j. 17.5 × 40 = 17.5 × 4 × 10 = 70 × 10 = 700

k. 8.814 × 500 = 8.814 × 5 × 100 = 44.07 × 100 = 4407

l–m. Similar working as above.

n. 19.365 × 2000 = 19.365 × 2 × 1000 = 38.730 × 1000 = 38730

2. a. 2.7 × 0.6

$\begin{array}{r} 27 \\ \times\ \ \ 6 \\ \hline 162 \end{array}$

The number of digits after the decimal point in the multiplicand is 1 and multiplier is 1.

∴ 2.7 × 0.6 = 1.62

b. 7.26 × 4

⇒ $\begin{array}{r} 726 \\ \times\ \ \ 4 \\ \hline 2904 \end{array}$

∴ 7.26 × 4 = 29.04

c–d. Similar working as above.

e. $\begin{array}{r} 2672 \\ \times\ \ \ 12 \\ \hline 5344 \\ +\ 26720 \\ \hline 32064 \end{array}$

∴ 26.72 × 1.2 = 32.064

f. Similar working as above.

g. $\begin{array}{r} 467 \\ \times\ \ 138 \\ \hline {\scriptstyle 1}3736 \\ 14010 \\ +\ 46700 \\ \hline 64446 \end{array}$

The number of digits after decimal point in the multiplicand = 1

The multiplier = 1

Total number of digits after decimal point = 2

∴ 46.7 × 13.8 = 644.46

h. 6.789×0.4

$\Rightarrow$ 6 7 8 9

$\times$ 4

2 7 1 5 6

$\therefore \quad 6.789 \times 0.4 = 2.1756$

i. Similar working as above.

Exercise 8.7

1.
- When a decimal is divided by 10, the decimal point moves towards the left by 1 place.
- When a decimal is divided by 100, the decimal point moves towards the left by 2 places.
- When a decimal is divided by 1000, the decimal point moves towards the left by 3 places.

a. $98 \div 10 = 9.8$ b. $234 \div 100 = 2.34$ c. $6405 \div 1000 = 6.405$

d. $45.5 \div 10 = 4.55$ e. $395.6 \div 100 = 3.956$

f. $482.16 \div 1000 = 0.48216$ g. $39.1 \div 1000 = 0.0391$

(A zero is placed before first digit if the number of digits is less than the required number of decimal places.)

h. $2.46 \div 30 = 2.46 \times \frac{1}{30}$ or $\frac{^{82}\cancel{246}}{100} \times \frac{1}{\cancel{30}_{10}} = \frac{82}{1000} = 0.082$

i. $38.14 \div 50 = \frac{3814}{100} \times \frac{1}{50} \times \frac{2}{2} = \frac{3814 \times 2}{100 \times 100} = \frac{7628}{10000} = 0.7628$

j. $4.86 \div 200 = \frac{^{243}\cancel{486}}{100} \times \frac{1}{\cancel{200}_{100}} = \frac{243}{10000} = 0.0243$

k. $214.1 \div 500 = \frac{2141}{10} \times \frac{1}{500} \times \frac{2}{2} = \frac{4282}{10000} = 0.4282$

2. a. $18.0 \div 3 = {}^{6}\cancel{18}.0 \times \frac{1}{\cancel{3}} = 6$

b. $56.64 \div 2 = \frac{^{2832}\cancel{5664}}{100} \times \frac{1}{\cancel{2}} = \frac{2832}{100} = 28.32$

c. $40.96 \div 16 = \frac{\cancel{4096}^{\,1024^{\,256}}}{100} \times \frac{1}{\cancel{16}_{\,4_1}} = \frac{256}{100}$ or 2.56

d. $188.28 \div 12 = \frac{\cancel{18828}^{\,9414^{\,4707^{\,1569}}}}{100} \times \frac{1}{\cancel{12}_{\,6_3}} = \frac{1569}{100} = 15.69$

e. Similar working as above.

f. $6.300 \div 2.10 = \frac{63\cancel{0}\,\cancel{0}}{1\cancel{0}\,\cancel{0}\,\cancel{0}} \times \frac{1\cancel{0}\,\cancel{0}}{21\cancel{0}} = \frac{\cancel{63}^{\,3}}{\cancel{21}_{\,1}} = 3$

g. $56.4 \div 4.8 = \frac{56.1}{10} \div \frac{48}{10} = {}^{141}\frac{\cancel{564}}{\cancel{10}} \times \frac{\cancel{10}}{\cancel{48}_{12}} = \frac{141}{12} = 11.75$

h. Similar working as above.

i. $10.15 \div 1.45 = \frac{\cancel{1015}^{\,203^{\,7}}}{\cancel{145}_{\,29}} = 7$

j. Similar working as above.

k. $0.3375 \div 0.125 = \frac{3375}{10000} \div \frac{125}{1000} = \frac{\cancel{3375}^{675}{}^{135}{}^{27}}{\cancel{10000}} \times \frac{\cancel{1000}}{\cancel{125}_{25}{}_{5}} = \frac{27}{10}$ or 2.7

l. Similar working as above.

3. a. $81 \div 0.9$ or $\frac{81 \times 10}{0.9 \times 10} = \frac{810}{9}$

$9\overline{)810}\,\overline{90}$

$-\,81$

0

$\therefore$ Quotient = 90

b. $99 \div 1.1 = \frac{99}{1.1} = \frac{99 \times 10}{1.1 \times 10} = \frac{990}{11}$

$11\overline{)990}\,\overline{90}$

-99

0

$\therefore$ Quotient = 90

c. $4620 \div 2.5 = \frac{4620 \times 10}{2.5 \times 10} = \frac{46200}{25}$

Now, $25\overline{)46200}\,\overline{1848}$

$-25\downarrow$

212

-200

120

-100

200

-200

$\times$

$\therefore$ Quotient = 1848

d. $69 \div 0.23 = \frac{69 \times 100}{0.23 \times 100} = \frac{6900}{23}$

Now,

$23\overline{)6900}\,\overline{300}$

$-69\downarrow$

00

00

xx

$\therefore$ Quotient = 300

e. $525 \div 1.68 = \frac{525 \times 100}{1.68 \times 100} = \frac{52500}{168}$

Now $168\overline{)52500}\,\overline{312.5}$

-504

210

-168

420

-336

840

-840

x

$\therefore$ Quotient = 312.5

f–h. Similar working as above.

Exercise 8.8

1. Total length of 3 pieces of wood is

$$\begin{array}{r} {\scriptstyle ①\,①} \\ 2.46\text{ m} \\ 1.35\text{ m} \\ +\,0.92\text{ m} \\ \hline 4.73\text{ m} \end{array}$$

2. Money spent on icecream = ₹12.06
Money spent on snacks = ₹63.24
Money spent on movie ticket = ₹90.90
Total money spent = ₹(12.06 + 63.24 + 90.90) = ₹166.20

3. Total length of ribbon = 16.70 m
Length of the piece cut off from it = 8.45 m
Length of the ribbon left = (16.70 – 8.45) m = 8.25 m.
or
$$\begin{array}{r} 16.70\,\text{m} \\ -\ 8.45\,\text{m} \\ \hline 8.25\,\text{m} \end{array}$$

4. Initial weight = 97.5 kg
Weight lost = 13.8 kg
Present weight = (97.5 – 13.8) kg = 83.7 kg

5. Length of each ribbon piece = 1.50 m
Number of pieces = 27
Total length of the ribbon = (27 × 1.50) m = 40.50 m

6. The rate at which man worked = ₹110.50 per hour
Number of hours worked = 30
Money earned = ₹(110.50 × 30) = ₹3315

7. Rate of cloth = ₹78.50 per metre
Length of cloth purchased = 2.3 m
Total amount spent = ₹(78.50 × 2.3) = ₹180.55

8. Total cloth = 18 m
Cloth required for 1 suit = 2.5 m
Number of suit that can be made from 20 m cloth

$$= 20 \div 2.5 \text{ or } \frac{20 \times 10}{2.5 \times 10} = \frac{\cancel{200}^{\,40\,8}}{\cancel{25}_{\,5}} = 8$$

Number of suits that can be made from 20 m cloth is 8.

9. Distance covered in 16 litres = 157.6 km
Distance covered in 1 litre = (157.6 ÷ 16) km = 9.85 km

10. Cost of 12.5 kg of sugar = ₹291.25
Cost of 1 kg of sugar = ₹(291.25 ÷ 12.5) = ₹23.30
Cost of 3.5 kg of sugar = ₹(23.30 × 3.5) = ₹81.55

Exercise 8.9

1. 10 mm = 1 cm
To convert 'mm' into 'cm', we divide the given number by 10.

a. 49 mm = $\frac{49}{10}$ cm or 4.9 cm b. 148 mm = $\frac{148}{10}$ cm or 14.8 cm

c. 6 cm 4 mm = 6 cm + $\frac{4}{10}$ cm = (6 + 0.4) cm or 6.4 cm

d. 92 cm 2 mm = $\left(92 + \frac{2}{10}\right)$ cm = (92 + 0.2) cm = 92.2 cm

2. 100 cm = 1 m
To convert 'cm' into 'm', we divide the given number by 100.

a. 845 cm = $\frac{845}{100}$ m = 8.45 m

b. 1248 cm = $\frac{1248}{100}$ m = 12.48 m

c. 983 m 12 cm = $\left(983 + \frac{12}{100}\right)$ m = 983 + 0.12 = 983.12 m

d. 1755 m 36 cm = $\left(1755 + \frac{36}{100}\right)$ m = (1755 + 0.36) m = 1755.36 m

3. 1000 g = 1 kg

To convert 'g' into 'kg', we divide it by 1000.

a. 8145 g = $\frac{8145}{1000}$ kg = 8.145 kg

b. 15005 g = $\left(\frac{15005}{1000}\right)$ kg = 15.005 kg

c. 7 kg 125 g = $\left(7 + \frac{125}{1000}\right)$ kg = 7 + 0.125 kg = 7.125 kg

d. 25 kg 15 g = $\left(25 + \frac{15}{1000}\right)$ kg = 25.015 kg

4. 100 paise = 1 rupee

To convert paise into rupees, we divide it by 100.

a. 7575 paise = ₹$\frac{7575}{100}$ = ₹75.75 b. 9003 paise = ₹$\frac{9003}{100}$ = ₹90.03

c. 5 rupees 25 paise = ₹$\left(5 + \frac{25}{100}\right)$ = ₹(5 + 0.25) = ₹5.25

d. 20 rupees 8 paise = ₹$\left(20 + \frac{8}{100}\right)$ = ₹(20 + 0.08) = ₹20.08

5. 1000 mL = 1 L

To convert mL in L, we divide it by 1000.

a. 4500 mL = $\frac{4500}{1000}$ L = 4.5 L

b. 10030 mL = $\frac{10030}{1000}$ L = 10.030 L

c. 12 L 275 mL = $\left(12 + \frac{275}{1000}\right)$ L = (12 + 0.275) L = 12.275 L

d. 15 L 50 mL = $\left(15 + \frac{50}{1000}\right)$ L = (15 + 0.050) L = 15.050 L

6. a. ₹17.25 = 17.25 × 100 p = 1725 p b. 9.050 L = 9.050 ×1000 mL = 9050 mL

c. 15.375 km = 15.375 × 1000 km = 15375 m d. ₹56.35 = 56.35 × 100 p = 5635 p

e. 21.300 L = 21.300 × 1000 mL = 21300 mL f. 12.950 km = 12.950 × 1000 m = 12950 m

g. 17.5 cm = 17.5 × 10 mm = 175 mm h. 25.6 cm = 25.6 × 10 m = 256 mm

i. 14.5 m = 14.5 × 100 cm = 1450 cm j. 35.08 m = 35.08 × 100 cm = 3508 cm

k. 8.15 kg = 8.15 × 1000 g = 8150 g l. 11.04 kg = 11.04 × 1000 g = 11040 g

Exercise 8.10

1. To convert a fraction into percentage, we multiply it by 100 and put the symbol '%'.

a. $\frac{3}{5} = \left(\frac{3}{\cancel{5}_{1}} \times \cancel{100}^{20}\right)\% = 60\%$

b. $\frac{5}{8} = \left(\frac{5}{8} \times 100\right)\% = \frac{\cancel{500}^{250^{125}}}{\cancel{8}_{4_{2}}}\% = \frac{125}{2}\% = 62.5\%$

c. $\frac{13}{25} = \left(\frac{13}{\cancel{25}_{1}} \times \cancel{100}^{4}\right)\% = 52\%$

d. $1\frac{3}{20} = \left(\frac{23}{\cancel{20}_{1}} \times \cancel{100}^{5}\right)\% = 115\%$

e. $8\frac{2}{5} = \left(\frac{42}{\cancel{5}} \times \cancel{100}^{20}\right)\% = 840\%$

2. To convert a decimal into percentage, move the decimal point two places to the right and attach the per cent sign.

a. 0.7 = 70% b. 4.6 = 460% c. 0.158 = 15.8%

d. 64.02 = 6402% e. 5.021 = 502.1%

3. To convert percentage into fraction, we write 100 under the number.

a. $9\% = \frac{9}{100}$

b. $33\% = \frac{33}{100}$

c. $5.6\% = \frac{5.6}{100}$ or $\frac{\cancel{56}^{7}}{\cancel{1000}_{125}} = \frac{7}{125}$

d. $82\% = \frac{82}{100} = \frac{82 \div 2}{100 \div 2} = \frac{41}{50}$

e. $132\% = \frac{132}{100} = \frac{132 \div 4}{100 \div 4} = \frac{33}{25}$ or $1\frac{8}{25}$

4. To convert percentage into decimals, we move the decimal point two places to the left.

a. $35\% = \frac{35}{100} = 0.35$ b. $85\% = \frac{85}{100} = 0.85$ c. $125\% = \frac{125}{100} = 1.25$

d. $4.5\% = \frac{4.5}{100} = 0.045$ e. $10.75\% = \frac{10.75}{100} = 0.1075$

5. a. 35% of 100 $= \frac{35}{100}$ of 100 $= \frac{35}{\cancel{100}} \times \cancel{100} = 35$

b. 50% of 800 $= \frac{50}{100}$ of 800 $= \frac{50}{\cancel{100}} \times \cancel{800}^{8} = 400$

c. 90% of 450 $= \frac{90}{100}$ of 450 $= \frac{\cancel{90}}{\cancel{100}} \times \cancel{450} = 405$

d. 20% of 625 $= \frac{20}{100}$ of 625 $= \frac{\cancel{20}}{\cancel{100}_{5}} \times \cancel{625}^{125} = 125$

6. a. 1 kg = 1000 g

$\therefore$ 25% of 1 kg $= \frac{25}{100}$ of 1000 g $= \frac{25}{\cancel{100}} \times \cancel{1000}\ \text{g} = 250\ \text{g}$

b. 55% of 70 m = $\frac{55}{100}$ of 70 = $\frac{\cancel{55}^{11}}{\cancel{100}_{2}} \times 7\cancel{0}$ m = $\frac{77}{2}$ m = 38.5 m

c. 40% of 500 L = $\frac{40}{100}$ of 500 L = $\frac{40}{1\cancel{00}} \times 5\cancel{00}$ L = 200 L

d. 60% of ₹1200 = $\frac{60}{100}$ of ₹1200 = $\frac{60}{1\cancel{00}} \times 12\cancel{00}$ = ₹720

7. a. 1 kg = 1000 g ∴ 5 kg = 5000 g

Now 50 g of 5 kg = $\left(\frac{^{1}\cancel{50}}{_{1}\cancel{5000}} \times \cancel{100}\right)\% = 1\%$

b. 1 L = 1000 mL

∴ Converting 250 mL of 1L as a percentage

$= \left(\frac{250}{1000} \times 100\right)\% = 25\%$

c. ₹1 = 100 paise ∴ ₹2 = 200 paise

Now percentage of 10 paise of 200 paise

$= \left(\frac{\cancel{10}^{5}}{\cancel{200}} \times \cancel{100}\right)\% = 5\%$

d. 1 km = 1000 m ∴ 6 km = 6000 m

Now percentage of 300 m of 6000 m

$= \frac{\cancel{300}^{5}}{\cancel{6000}} \times \cancel{100} = 5\%$

e. ₹125 of ₹400

Percentage = $\frac{125}{\cancel{400}} \times \cancel{100} = 31.25\%$

f. 2.4 kg of 3 kg = $\left(\frac{2.4}{3} \times 100\right)\% = \left(\frac{^{8}\cancel{24}}{\cancel{3} \times 1\cancel{0}} \times 10\cancel{0}\right)\% = 80\%$

g. $\frac{36}{\cancel{50}} \times 1\cancel{00}^{2} = 72\%$

h. $\frac{\cancel{420}^{7}}{\cancel{600}} \times 1\cancel{00} = 70\%$

i. $\frac{\cancel{350}^{70}}{\cancel{500}} \times 100 = 70\%$

j. 1 h = 60 min ∴ 2 h = 120 min

Now, $\left(\frac{1\cancel{2}}{\cancel{12}\cancel{0}} \times \cancel{100}^{10}\right)\% = 10\%$

k. 1 day = 24 h ⇒ $2\frac{1}{2}$ days = $\frac{5}{\cancel{2}} \times \cancel{24}^{12}$ h = 60 h. Now, $\left(\frac{\cancel{24}^{4}}{\cancel{60}} \times 10\cancel{0}\right)\% = 40\%$

Exercise 8.11

1. a. 20% of 150 = $\frac{\cancel{20}^{10}}{\cancel{100}_{2}} \times \cancel{150}^{3} = 30$

30% of 180 = $\frac{\cancel{30}}{\cancel{100}} \times \cancel{180} = 54$

Since 54 > 30.

∴ 30% of 180 is greater than 20% of 150.

b. 15% of 300 = $\frac{15}{\cancel{100}} \times \cancel{300} = 45$

12% of 200 = $\frac{12}{\cancel{100}} \times \cancel{200} = 24$

Since 45 > 24. ∴ 15% of 300 is greater than 12% of 200.

2. Kartik's pocket money = ₹500

Amount he spends = 80% of ₹500 = ₹$\left(\frac{80}{\cancel{100}} \times \cancel{500}^{5}\right)$ = ₹400

3. Maximum marks in the examination = 540

Raghav scored = 75% of 540

= $\frac{\cancel{75}^{3}}{\cancel{100}_{4_1}} \times \cancel{540}^{135} = 405$

4. Ajeet's weight = 75 kg

His son's weight = 60% of 75 kg = $\frac{\cancel{60}^{15}}{\cancel{100}_{4}} \times \cancel{75}^{3}$ kg = 45 kg

5. Total fruits sold in a day = 80 kg

Apples sold = 30% of 80 kg = $\left(\frac{\cancel{30}}{\cancel{100}} \times \cancel{80}\right)$ kg = 24 kg

6. Milk sold in a day = 2.5 L

Water mixed in the milk = 20% of 2.5 L

= $\frac{\cancel{20}}{\cancel{100}_{5}} \times 2.5 = \frac{2.5}{5} = \frac{25}{5 \times 10} = \frac{\cancel{25}^{5}}{\cancel{50}_{10_2}} = \frac{1}{2}$ = 0.5 L or 500 mL

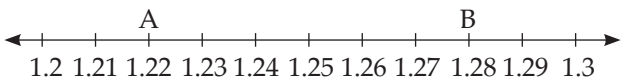
Test Your Skills

Multiple Choice Questions

1–5. Refer answers at the end of the book.

Mental Maths

1.



2. $65 + \frac{5}{100} = 65\frac{5}{100} = 65.05$ (True)

3. 13.61 is rounded off to 13.60 = 13.6.

4. 56 out of 100 squares are shaded. So its percentage = $\frac{56}{100} = 56\%$

5. Successor of 9999 = 9999 + 1 = 10000

2% of the successor = 2% of 10000 = $\frac{2}{100} \times 10000 = 200$

So, required number = 10000 + 200 = 10200

Apply Your Skills

Problem Solving Assessment

1. a. 20 % of ₹25 ☐ 25 % of ₹30

$\Rightarrow \frac{20}{100} \times 25 \square \frac{25}{100} \times 30$

$\Rightarrow 5 \boxed{<} 7.5$

b. 6% of 6 ☐ 7% of 9

$\Rightarrow \frac{6}{100} \times 6 \square \frac{7}{100} \times 9$

$\Rightarrow 3.6 \boxed{<} 6.3$

2. a. 13% of x = ₹169 $\Rightarrow \frac{13}{100}\ x = 169$

$\Rightarrow x = 169 \div \frac{13}{100} \Rightarrow 169 \times \frac{100}{13} =$ ₹1300

Alternate method:

Let the total money = ₹100

⇒ ₹13 when total is ₹100.

∴ ₹1 when total is ₹$\frac{100}{13}$.

∴ ₹169 when total is ₹$\frac{100}{13} \times 169 =$ ₹1300

b. 5% of x = ₹750 $\Rightarrow \frac{5}{100}\ x = 750 \Rightarrow x = 750 \div \frac{5}{100} = 750 \times \frac{100}{5} =$ ₹15000

c. 8% of x = ₹48 $\Rightarrow \frac{8}{100}\ x = 48$

$\Rightarrow x = 48 \div \frac{8}{100} = 48 \times \frac{100}{8} =$ ₹600

d. 80% of x = ₹16 $\Rightarrow \frac{80}{100}\ x = 16$

$\Rightarrow x = 16 \div \frac{80}{100} = 16 \times \frac{100}{80} =$ ₹20

15000 > 1300 > 600 > 20

So, b > a > c > d.

3. Cloth needs for safari suit = 1.40 m + 2.75 m = 4.15 m

Length of cloth gifted by Vimal's mother = 4.15 m – 0.82 m = 3.33 m

4. Do it yourself.

5. Salary saved by Rishab = ₹13200

22 % of x = ₹13200 $\Rightarrow \frac{22}{100}\ x = 13200$

$\Rightarrow x = \frac{6600}{13200} \times \frac{100}{22} =$ ₹60,000 (= salary of Abhay)

Salary saved by Abhay = 14% of ₹60,000

$= ₹ \frac{14}{\cancel{100}} \times \cancel{60000} = ₹8400$

Value Based Questions

1. Total amount spent by Mr. Lal = ₹4975.50 + ₹2496.50 + ₹1500 = ₹8972
   Value: Concern for poor.
2. Saplings donated for planting across the roads
   = 10 % of 10000

   $= \frac{10}{\cancel{100}} \times \cancel{10000} = 1000$

   Saplings left = 10000 – 1000 = 9000

   Saplings donated for decorating the park = 5% of 9000 $= \frac{5}{\cancel{100}} \times \cancel{9000} = 450$

   Total saplings donated by Savita = 1000 + 450 = 1450

   Value: Care for environment.
3. Money spent by Ravi for his family = 100 – (20 + 5) = 75%

   That means, Ravi spends ₹75 if his earnings is ₹100.

   He spends ₹1 if his earnings is $₹\frac{100}{75}$.

   He spends ₹15000 if his earnings is $₹\frac{100}{\cancel{75}} \times \cancel{15000}^{200} =$ ₹20000

   Total earnings of Ravi = ₹20000

   Value: Family values.

HOTS

1. Money spent by Ananya in a month = ₹747.50 + ₹310.25 + ₹450.25 + ₹100 = ₹1608.00
   Money spent by Ananya for the whole year = ₹1608.00 × 12 = ₹19296
2. Weight of suitcase $= \frac{2}{3} \times$ weight of trunk $= \frac{2}{3} \times 21.60$ kg = 14.4 kg

   Weight of bag $= \frac{1}{10} \times$ weight of suitcase $= \frac{1}{10} \times \frac{2}{3} \times$ weight of trunk

   $= \frac{2}{30} \times$ weight of trunk $= \frac{2}{30} \times 21.60$ kg = 1.44 kg

   Total weight of suitcase and bag = 14.4 + 1.44 = 15.84 kg.

CHAPTER 9

Simplifications and Average

Lesson Plan

OBJECTIVES

The students should know about

(i) DMAS Rule (ii) Average

Prerequisite Knowledge: The students should have the basic knowledge of simplification of the whole numbers as they have studied in their previous classes.

Teaching Aids: Writing board, marker, chalks, charts, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics of this lesson will be taught in the class by taking some examples.

(i) **DMAS:** Division, Multiplication, Addition and Subtraction are used in simplification.

(ii) **Simplify:** $40 - 36 \div 9 \times 5 + 3$

Using DMAS,

$$40 - \underline{36 \div 9} \times 5 + 3$$
$$= 40 - \underline{4 \times 5} + 3$$
$$= 40 - 20 + 3$$
$$= 43 - 20$$
$$= 23$$

(iii) **Average** $= \dfrac{\text{Sum of given quantities}}{\text{Total number of quantities}}$

Example: Find the average of the following numbers.

26, 20, 36, 48 and 60

$$\text{Average} = \frac{26+20+36+48+60}{5} = \frac{190}{5} = 38$$

(iv) **Word Problem:** Three factories produce 90 articles, 82 articles and 95 articles respectively. Find the average production.

$$\text{Average production} = \frac{90+82+95}{3}$$
$$= \frac{267}{3} = 89 \text{ articles}$$

Recapitulation: The whole chapter will be revised in the class by the involvement of the students and their problems will be solved accordingly.

Home Assignments

(A) From Textbook

(i) Exercise 9.1—Solve Q. No. 1 and 2 all parts.

(ii) Exercise 9.2—Solve Q. No. 1 and 2 all parts.

(B) Extra Questions

(i) Simplify: $15 + 12 \div 3 \times 4 - 6 \times 2$

(ii) Find the average of 65, 67 and 69.

Textbook Solutions

Exercise 9.1

1. To simplify we use the DMAS rule.

a. $24 \div 2 + 5 = 12 + 5 = 17$

b. $6 + 15 \div 3 = 6 + 5 = 11$

c. $33 \div 3 - 11 = 11 - 11 = 0$

d. $39 \div 13 + 10 = 3 + 10 = 13$

e. $42 \times 6 \div 3 = 42 \times 2 = 84$

f. $63 - 3 \times 21 = 63 - 63 = 0$

g. $100 - 40 \div 5 = 100 - 8 = 92$

2. We follow DMAS rule.

Here, multiplication and division rank equally, and addition and subtraction also rank equally.

a. $11 - 6 \div 2 \times 3 = 11 - 3 \times 3 = 11 - 9 = 2$

b. $30 \div 3 + 6 \times 3 - 10 = 10 + 18 - 10 = 28 - 10 = 18$

c. $18 \times 20 \div 4 - 55 = 18 \times 5 - 55 = 90 - 55 = 35$

d. $14 - 21 \div 7 + 4 \times 2 = 14 - 3 + 8 = 11 + 8 = 19$

e. $82 - 42 \div 21 \times 2 = 82 - 2 \times 2 = 82 - 4 = 78$

f. $20 \times 5 + 15 \times 4 - 130 = 100 + 60 - 130 = 160 - 130 = 30$

Exercise 9.2

1. a. Sum of the given quantities = 18 + 24 + 32 + 46 = 120

Number of quantities = 4

$$\text{Average} = \frac{\text{Sum of given quantities}}{\text{Total number of quantities}} = \frac{\cancel{120}^{\cancel{60}^{30}}}{\cancel{4}_{\cancel{2}}} = 30$$

b. Sum of the given quantities = 36 + 50 + 54 + 77 + 83 = 300

Number of quantities = 5

$$\text{Average} = \frac{\cancel{300}^{60}}{\cancel{5}} = 60$$

c.–e. Similar working as above.

2. a. First ten natural numbers = 1, 2, 3, 4, 5, 6, 7, 9, 10

$$\text{Average} = \frac{1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10}{10} = \frac{55}{10} = 5.5$$

b. First 5 multiples of 5 = 5, 10, 15, 20, 25

$$\text{Average} = \frac{5 + 10 + 15 + 20 + 25}{5} = \frac{\cancel{75}^{15}}{\cancel{5}} = 15$$

c. First five composite numbers = 4, 6, 8, 9, 10

$$\text{Average} = \frac{4 + 6 + 8 + 9 + 10}{5} = \frac{37}{5} = 7.4$$

d. Marks obtained by 5 friends = 98, 96, 84, 72, 85

$$\text{Average marks} = \frac{98 + 96 + 84 + 72 + 85}{5} = \frac{\cancel{435}^{87}}{\cancel{5}} = 87$$

e. Rainfall in a city for 11 consecutive years = 200 cm, 150 cm, 240 cm, 160 cm, 77 cm, 225 cm, 161 cm, 240 cm, 160 cm, 85 cm, 205 cm

$$\text{Average} = \frac{\text{Sum of rainfall in 11 consecutive years}}{11}$$
$$= \frac{(200 + 150 + 240 + 160 + 77 + 225 + 161 + 240 + 160 + 85 + 205)\text{ cm}}{11}$$
$$= \frac{1903}{11}\text{ cm} = 173\text{ cm}$$

f. Average weight of 6 mangoes = 1 kg
Total mangoes in 17 kg = 6 × 17 = 102

g. Average earning of 12 persons in 1 month = ₹3400
Total earning in 1 month of 12 persons = ₹3400 × 12 = ₹40800

Test Your Skills

Multiple Choice Questions

1. b. $\text{Average} = \frac{12 + 20 + 30 + 42 + 16}{5} = \frac{\cancel{120}^{24}}{\cancel{5}} = 24$

2. d. $48 + 3 \times 12 \div 6 - 11 = 48 + 3 \times 2 - 11 = 48 + 6 - 11 = 54 - 11 = 43$

3. b. $13.5 + 12.5 \div 4 = 13.5 + 3.125 = 16.625$

4. d. Average cost of 5 articles = ₹40
Total cost of 5 articles = ₹40 × 5 = ₹200

5. b. Prime numbers between 1 to 20 = 2, 3, 5, 7, 11, 13, 17, 19

$$\text{Average} = \frac{2 + 3 + 5 + 7 + 11 + 13 + 17 + 19}{8} = \frac{77}{8} = 9.625$$

Mental Maths

1. Number = (93 – 73) × (3 + 2) = 20 × 5 = 100

2. $\text{Average Income} = \frac{133.75 + 135.50 + 143.25 + 145.50}{4} = \frac{558}{4} = 139.50$

3. $17.2 - 2.9 + 1 \times 4.1 + 2.1 = 17.2 - 2.9 + 4.1 + 2.1$
$= 17.2 + 6.2 - 2.9 = 23.4 - 2.9 = 20.5$

4. Total no. of biscuits in 6 small packets and 1 big packet = 10 × 6 + 15 × 1 = 75
Biscuits are distributed among 6 friends, dividing 75 by 6 we get 12 as quotient and 3 as remainder.
Thus, each friend gets 12 biscuits and 3 biscuits are left.

$$\begin{array}{r|l} 6 & 75 \\ -6 & \\ \hline 15 & \\ -12 & \\ \hline 3 & \end{array} \quad 12$$

5. Temperature in the morning = Temperature in the afternoon – 3°C
Temperature at night = Temperature in the afternoon – 6°C
∴ Temperature in the afternoon = Temperature at night + 6°C
Temperature in the afternoon = 6°C + 3°C = 9°C
Temperature in the morning = 9°C – 3°C = 6°C
Total temperature = 6°C + 9°C + 3°C = 18°C
Average temperature of the day = $\frac{18°C}{3}$ = 6°C.

Problem Solving Assessment

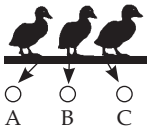
1. a. $72 \div (3 \times 4) = 72 \div 12 = 6$

b. $72 - (7 \times 9) = 72 - 63 = 9$

c. $84 - (12 \times 6) \Rightarrow 84 - 72 = 12$

d. $13 + 5 \times (35 + 25) = 13 + 5 \times 60 = 13 + 300 = 313$.

2. Total sweets $= 4 \times 3 + 7 \times 3 + 10 \times 3 = 12 + 21 + 30 = 63$

3. 

Total = 3 ducks

4. Present population $= 54000 + \frac{2}{\cancel{3}} \times \overset{18000}{\cancel{54000}} = 54000 + 36000 = 90000$

Value Based Questions

1. People educated on 1st day = 10

People educated on 2nd day $= 2 \times 10 = 20$

People educated on 3rd day $= 2 \times 20 = 40$

People educated on 4th day $= 2 \times 40 = 80$

People educated on 5th day $= 2 \times 80 = 160$.

So, Average $= \frac{10 + 20 + 40 + 80 + 160}{5} = \frac{310}{5} = 62$; **Value:** Cleanliness

2. Total amount spent $= 5 \times ₹323.75 + 4 \times ₹675.50 + ₹250.75$

$= ₹1618.75 + ₹2702 + ₹250.75 = ₹4571.50$, **Value:** Concern for needy.

HOTS

1. a. Number of notebooks with children $= 12 \times 6 + 8 \times 3 = 72 + 24 = 96$

Notebooks left after given to the teacher $= 96 - 60 = 36$

Notebooks given to the headmaster $= 36 \div 2 = 18$

Notebooks left at last $= 96 - (60 + 18) = 96 - 78 = 18$

b. Toffees bought $= 7 \times 10 = 70 + 3$ (free) $= 73$

Toffees distributed $= 73 - 4 = 69$

Number of students $= 69 \div 3 = 23$

CHAPTER 10

Geometry

Lesson Plan

OBJECTIVES

The students should know about

(i) Basic definition: point, line, plane

(ii) Concurrent lines, intersecting lines, parallel lines and perpendicular lines

(iii) Angles and their types

(iv) Measurement of angles

(v) Construction of angles

(vi) Triangles and types of triangles

(vii) Angle sum property of triangle

(viii) Types of quadrilateral

(ix) Circle and its properties

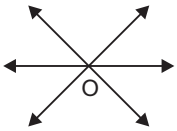
Prerequisite Knowledge: The students should have the basic knowledge of lines, planes, angles and triangles as they have studied in their previous classes.

Teaching Aids: Writing board, marker, chalks, chart, duster, geometrical box, smart-board/projector and the pointer.

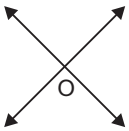
Method of Teaching: The following topics and subtopics of this chapter will be taught in the class.

(i) **Lines:**

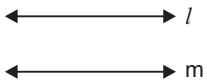
(a) Concurrent: Passing through the same point



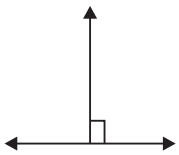
(b) Intersecting lines:



(c) Parallel lines:



(d) Perpendicular lines:



(ii) **Angles:**

(a) Acute angle: less than 90°.

(b) Obtuse angle: more than 90°.

(c) Right angle : equal to 90°.

(iii) **Triangles:**

(a) Scalene triangle (b) Isosceles triangle (c) Equilateral triangle

(d) Right-angled triangle (e) Acute-angled triangle (f) Obtuse-angled triangle

(iv) **Angle sum property of a triangle:** The sum of all the three angles of a triangle is 180°.

(v) **Types of quadrilateral:**

(a) Rectangle (b) Square (c) Parallelogram

(d) Rhombus (e) Trapezium (f) Kite

Recapitulation: The whole chapter will be revised in the class involving the students and their problems will be solved accordingly.

Home Assignments

(A) From Textbook

(i) Exercise 10.1—Solve Q. No. 1 to 5 all parts.

(ii) Exercise 10.2—Solve Q. No. 1 to 4 all parts.

(iii) Exercise 10.3—Solve Q. No. 1 to 5 all parts.

(iv) Exercise 10.5—Solve Q. No. 1 to 3 all parts.

(v) Exercise 10.6—Solve Q. No. 1 to 4 all parts.

(B) Extra Questions

(i) Construct a circle with radius 3 cm.

(ii) In a □ ABCD, if ∠A = 45°, ∠B = 60°, ∠C = 120°, find the measurement of ∠D.

Textbook Solutions

Exercise 10.1

1.–7. Refer answers at the end of the book.

8. a. Edges of road, Edges of boundary wall

b. Intersection of walls and floor, T-point on the road.

Exercise 10.2

1.–4. Refer answers at the end of the book.

Exercise 10.3

1–5. Refer answers at the end of the book.

Exercise 10.4

1.–3. Let the students try by themselves.

4. Refer answers at the end of the book.

Exercise 10.5

1. a. Isosceles (2 sides are equal)

b. Scalene (all sides are different)

c. Equilateral (all sides are equal)

2. a. Acute-angled triangle (all angles are acute)

b. Obtuse-angled triangle (has 1 obtuse angle)

c. Right-angled triangle (has 1 right angle)

3. Let the students try by themselves.

4. Refer answers at the end of the book.

Exercise 10.6

1. Refer answers at the end of the book.

2. a. Yes; as 60° + 65° + 55° = 180°

b. No; as 90° + 50° + 50° = 190° ≠ 180°

c. No; as 40° + 40° + 40° = 160° ≠ 180°

d. Yes; as 145° + 15° + 20° = 180°

3. Refer answers at the end of the book.

4. Sum of angles of a triangle = 180°

a. In ΔABC,

$\angle C = 180° - (\angle A + \angle B)$

$= 180° - (55° + 72°)$

$= 180° - 127° = 53°$

b. In ΔPQR,

$\angle R = 180° - (\angle P + \angle Q)$

$\angle R = 180° - (37° + 82°)$

$\angle R = 180° - 119° = 61°$

c. In ΔXYZ,

$\angle Z = 180° - (\angle X + \angle Y)$

$= 180° - (105° + 30°)$

$= 180° - 135° = 45°$

d. In ΔDEF,

$\angle F = 180° - (\angle D + \angle E)$

$= 180° - (86° + 50°)$

$= 180° - 136° = 44°$

Exercise 10.7

1.–2. Refer answers at the end of the book.

Exercise 10.8

1.–4. Refer answers at the end of the book.

Exercise 10.9

1. Radius $= \frac{1}{2} \times$ diameter

a. D = 8 cm

$\therefore$ Radius $= \frac{1}{2} \times 8 = 4$ cm

b. D = 10 cm

$\therefore$ Radius $= \frac{1}{2} \times 10$ cm $= 5$ cm

c. D = 22 cm

$\therefore$ Radius $= \frac{1}{2} \times 22$ cm $= 11$ cm

d. D = 48 cm

$\therefore$ Radius $= \frac{1}{2} \times 48$ cm $= 24$ cm

2. Diameter = 2 × radius

a. R = 2.5 cm

$\therefore$ D = 2 × 2.5 cm = 5 cm

b. R = 3 cm

$\therefore$ D = 2 × 3 cm = 6 cm

c. R = 4.5 cm

$\therefore$ D = 2 × 4.5 cm = 9 cm

d. R = 7 cm

$\therefore$ D = 2 × 7 m = 14 cm

3. Circumference = 3 × diameter (approx.)

a. D = 6 cm

$\therefore$ Circumference = 3 × 6 cm (approx.) = 18 cm (approx.)

b. D = 7 cm

$\therefore$ Circumference = 3 × 7 cm (approx.) = 21 cm (approx.)

c. D = 10 cm

$\therefore$ Circumference = 3 × 10 cm (approx.) = 30 cm (approx.)

d. D = 15 cm

$\therefore$ Circumference = 3 × 15 cm(approx.) = 45 cm (approx.)

4. Circumference = 6 × radius (approx.)

a. R = 3.5 cm

$\therefore$ Circumference = 6 × 3.5 cm = 21 cm (approx.)

b. R = 6 cm

$\therefore$ Circumference = 6 × 6 cm = 36 cm (approx.)

c. R = 7.5 cm

$\therefore$ Circumference = 6 × 7.5 cm = 45 cm (approx.)

d. R = 9 cm

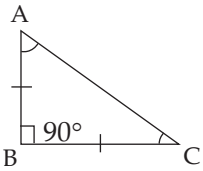
$\therefore$ Circumference = 6 × 9 cm = 54 cm (approx.)

5. Diameter = 9 units
Circumference = 3 × diameter (approx.)
= 3 × 9 units = 27 units (approx.)

6. Radius = 7 units
Circumference = 6 × 7 units = 42 units (approx.)

7.–10. Do it yourself.

Mental Maths

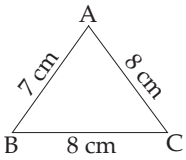


1. Refer answers at the end of the book.

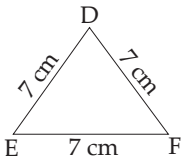
2. $\angle A + \angle B + \angle C = 180°$
$\angle A + 90° + \angle A = 180°$ [$\because$ $\angle A = \angle C$]
$2\angle A = 180° - 90° = 90° \Rightarrow \angle A = \frac{90°}{2} = 45°$

3. Diameter = 2 × 4.5 cm = 9 cm
Circumference = 6 × 4.5 = 27 cm (approx); False

4. a. 44.5° + 45.5° + 90° = 180°; Yes
b. 178° + 1° + 1° = 180°; Yes

5. a. 

Isosceles triangle, since AC = BC

b. 

Equilateral triangle, since DE = EF = FD

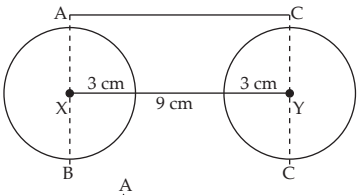
Test Your Skills

Multiple Choice Questions

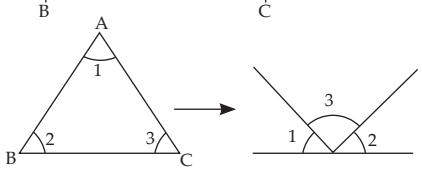
1–5. Refer answers at the end of the book.

Problem Solving Assessment

1. 

2. 

No, the circles do not touch each other. Yes, AB || CD.

3. 

4. Do it yourself.

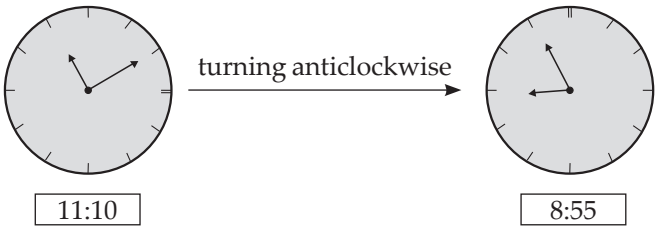
5.

Circles	Length of the radius	Length of the diameter	Length of the circumference
1.	1.5 cm	3 cm	6 × 1.5 cm = 9 cm
2.	2 cm	4 cm	6 × 2 cm = 12 cm
3.	3 cm	6 cm	6 × 3 cm = 18 cm

Value Based Questions

1. Circumference of circular park = 6 × 14 m = 84 m (approx.)
Money required for fencing the park thrice = 3 × 84 × ₹208 = ₹52,416, **Value:** Safety

2.



Right time at clock should be 8:55. **Value:** Care for elders.

HOTS

1. Do it yourself.

2. Shalini walked (Circumference of the park) = 3 × 650 m = 1950 m = 1 km 950 m
Reema walked (through centre 10 times) = 650 m × 10 = 6500 m = 6 km 500 m
Reema walked more than Shalini.

3. a. Yes, the sum of two sides is greater than the third side of the triangle.
4 cm + 6 cm > 5 cm, 4 cm + 5 cm > 6 cm, 5 cm + 6 cm > 4 cm
b. No, as 6 cm = 3 cm + 3 cm

CHAPTER 11

Perimeter, Area and Volume

Lesson Plan

OBJECTIVES

The students should know about
(i) Perimeter of rectangle, square, triangle and polygons
(ii) Area of irregular figures
(iii) Area of regular figures
(iv) Word problems
(v) Volume of solid figures

Prerequisite Knowledge: The students should have the basic knowledge of different kinds of figures as they have studied in their previous classes.

Teaching Aids: Writing board, marker, chalk, chart, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics and sub-topics will be taught to the students.

(i) Perimeter of rectangle = $2(l + b)$
Perimeter of square = $4l$
Perimeter of triangle = $a + b + c$

(ii) **Area**

(a) Area of rectangle = $l \times b$

(b) Area of square = l^2

(c) Area of triangle = $\frac{1}{2} \times b \times h$

(iii) **Volume**

(a) Volume of cuboid = $l \times b \times h$

(b) Volume of cube = l^3

Recapitulation: The whole chapter will be revised to the students by giving them the practical questions and their problems will be solved in the class.

Home Assignments

(A) From Textbook

(i) Exercise 11.1—Solve Q. No. 1 to 4 all parts.

(ii) Exercise 11.3—Solve Q. No. 1 to 4 all parts.

(iii) Exercise 11.6—Solve Q. No. 1 to 5 all parts.

(B) Extra Questions

(i) If the length and breadth of a rectangle are 10 cm and 8 cm respectively, find its perimeter and area.

(ii) If the perimeter of an equilateral triangle is 12 cm, find its each side.

(iii) Find the volume of a cube if its one side is 4 cm.

(iv) Find the volume of a cuboid whose edges are 10 cm, 8 cm and 6 cm respectively.

Textbook Solutions

Exercise 11.1

1. a. Perimeter = Sum of all sides
= (18 + 30 + 22 + 17) m = 87 m

b. Perimeter of rectangle = 2 (l + b)
= 2 (1.2 + 0.8) m (∵ 80 cm = 0.8 m)
= 2 × 2 = 4 m or 400 cm

c. Perimeter = 2 (l + b)
= 2 (8.5 + 7) cm = 2 × 15.5 cm = 31 cm

d–f. Similar working as above.

2 & 3. Refer answers at the end of the book.

4. a. Perimeter of rectangle = 2 (l + b)
= 2 (110 + 85) m = 2 × 195 m = 390 m
Cost of fencing at the rate of ₹25 per m = 390 × ₹25 = ₹9750

d. Perimeter of regular hexagon = 6 × side
= (6 × 25) cm
= 150 cm

b. Perimeter of square = 4 × side = 4 × 11 = 44 cm
Length covered by the pencil = 3 × 44 cm = 132 cm

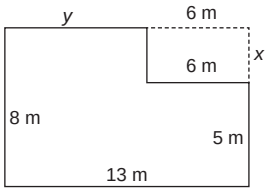
e. Perimeter of equilateral triangle = 3 × side
= 3 × 4 cm = 12 cm

f. Perimeter of regular pentagon = 5 × side
= 5 × 3 inches = 15 inches

c. Perimeter of triangle = 10 cm + 12 cm + 25 cm = 47 cm
= 47 × 10 mm = 470 mm ($\because$ 1 cm = 10 mm)

g. Perimeter of hexagon = 6 × side
Side of hexagon = Perimeter ÷ 6
= (42 ÷ 6) cm = 7 cm

5. Let us first find out the length of x and y.



Length of y = (13 – 6) m = 7 m
Length of x = (8 – 5) m = 3 m
Now, perimeter of plot
= [8 + 13 + (5 + 3) + (6 + 7)] m
= [8 + 13 + 8 + 13] m = 42 m
Wire need for fencing the plot = 42 m

Exercise 11.2

1. a. The no. of full boxes = 10
The no. of more than half boxes = 1
The no. of half boxes = 4

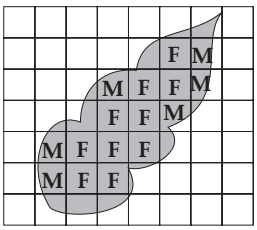
$\therefore$ Area of the figure = $\left(10 + 1 + \frac{1}{2} \times 4\right)$ = 11 + 2 = 13 sq cm

b. The no. of full boxes = 20
The no. of more than half boxes = 3
The no. of half boxes = 0
$\therefore$ Area of the figure = (20 + 3) cm^2 = 23 sq cm

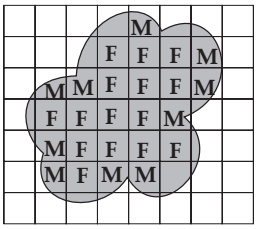
c. The no. of full boxes = 8
The no. of more than half boxes = 8
$\therefore$ Area of the figure = (8 + 8) cm^2
= 16 sq cm

d. The no. of full boxes = 18
The no. of more than half boxes = 4
$\therefore$ Area of the figure = (18 + 4) = 22 sq cm

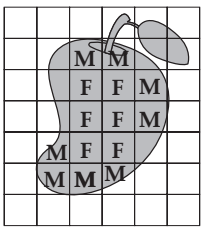
e. The no. of full boxes = 10
The no. of more than half boxes = 7
Area of the figure = 10 + 7
= 17 sq cm



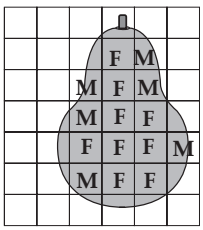
f. The no. of full boxes = 15
The no. of more than half boxes = 11
Area of the figure = 15 + 11
= 26 sq cm



g. The no. of full boxes = 6
The no. of more than half boxes = 8
Area of the figure = 6 + 8
= 14 sq cm



h. The no. of full boxes = 9
The no. of more than half boxes = 6
Area of the figure = 9 + 6
= 15 sq cm



Exercise 11.3

1. Area of square = side × side

a. Area = (7×7) m^2 = 49 sq mm ($\because$ side = 7 mm)

b. Area = (13×13) cm^2 = 169 sq cm ($\because$ side = 13 cm)

c. Area = (4.5×4.5) cm^2 = 20.25 sq cm ($\because$ side = 4.5 cm)

d. Area = (17×17) cm^2 = 289 sq cm ($\because$ side = 17 cm)

e. Area = (5.2×5.2) m^2 = 27.04 sq m ($\because$ side = 5.2 m)

f. Side = 24 m

$\therefore$ Area = (24×24) m^2 = 576 sq m

2. Area of the rectangle = Length × Breadth

a. l = 7 mm, b = 4 mm

$\therefore$ Area = (7×4) mm^2 = 28 sq mm

b. l = 3.5 cm, b = 1.5 cm

$\therefore$ Area = (3.5×1.5) cm^2 = 5.25 sq cm

c. l = 12 cm, b = 9 cm

$\therefore$ Area = (12×9) cm^2 = 108 sq cm

d. l = 19 m, b = 14 m

∴ Area = (19 × 14) m^2 = 266 sq m

e. l = 4.8 m, b = 3.2 m

∴ Area = (4.8 × 3.2) m^2 = 15.36 sq m

f. l = 35 m, b = 12 m

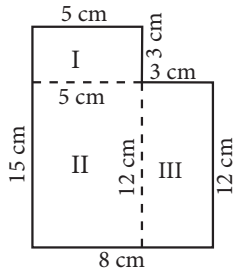
∴ Area = (35 × 12) m^2 = 420 sq m

3. a. Area = 1.5 cm × 1.5 cm = 2.25 sq cm

b. Area of rectangle = length × breadth

= 3.2 cm × 7 cm

= 22.4 sq cm



c. Area of part I = 5 × 3 = 15 sq cm

Area of part II = 12 cm × 5 cm = 60 sq cm

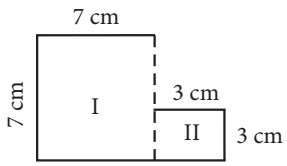
Area of part III = 12 cm × 3 cm = 36 sq cm

Total area = (15 + 60 + 36) cm^2 = 111 sq cm

d. Area of part I = 7 cm × 7 cm = 49 sq cm

Area of part II = 3 cm × 3 cm = 9 sq cm

Total area = (49 + 9) cm^2 = 58 sq cm

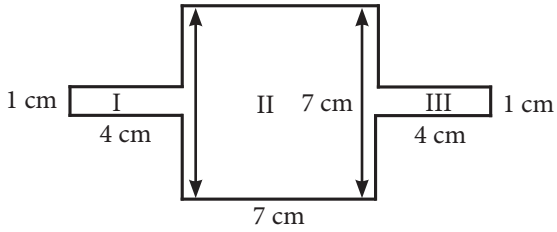


e. Area of part I = (4 × 1) cm^2 = 4 sq cm

Area of part II = 7 cm × 7 cm = 49 sq cm

Area of part III = 4 × 1 = 4 sq cm

Total area = (4 + 49 + 4) cm^2 = 57 sq cm



4. Area of a rectangle = Length × Breadth

Length of a rectangle = Area ÷ Breadth

Breadth of a rectangle = Area ÷ Length

Perimeter of a rectangle = 2 (l + b)

Now,

a. Length = 18 sq cm ÷ 3 cm = 6 cm

Perimeter = 2 (3 + 6) cm = 2 × 9 cm = 18 cm

b. Area = (9 × 4) cm^2 = 36 sq cm

Perimeter = 2 (9 + 4) cm = 2 × 13 cm = 26 cm

c. Breadth = (3600 ÷120) cm = 30 cm (as 1 m 20 cm = 120 cm)

Perimeter = 2 (120 + 30) cm = 2 × 150 cm = 300 cm

d. Length = (75 ÷ 5) cm = 15 cm

Perimeter = 2 (15 + 5) cm = 2 × 20 cm = 40 cm

e. Area = (9 × 6) sq cm = 54 sq cm

Perimeter = 2 (9 + 6) cm = 2 × 15 cm = 30 cm

f. Area = (220 × 160) sq cm (as 2 m 20 cm = 220 cm; 1 m 60 cm = 160 cm)
= 35200 sq cm = 3.52 sq m
Perimeter = 2 (220 + 160) cm = 2 × 380 cm = 760 cm or 7.6 m

5. a. Perimeter = 4 × 2 mm = 8 mm
Area = 2 mm × 2 mm = 4 sq mm

b. Perimeter of a square = 4 × side

$$\text{Side} = \frac{\text{Perimeter of a square}}{4} = \frac{3 \text{ cm } 2 \text{ mm}}{4} = \frac{^{8}\cancel{32} \text{ mm}}{\cancel{4}} = 8 \text{ mm}$$

Area = 8 mm × 8 mm = 64 sq mm

c. Area = side × side

$\Rightarrow$ $36 = s \times s$ $\Rightarrow$ $6 \times 6 = s \times s$

$\therefore$ s = 6 cm or side = 6 cm

Perimeter = 4 × 6 = 24 cm

d. Perimeter = 4 × 25 cm = 100 cm or 1 m
Area = 25 cm × 25 cm = 625 sq cm

e. $\text{Side} = \frac{60 \text{ cm}}{4} = 15 \text{ cm}$

Area = 15 × 15 = 225 sq cm

Exercise 11.4

1. Area of playarea = 5.2 m × 5.2 m = 27.04 sq. m

2. Area of the wall = (9 × 7) sq m = 63 m^2
Cost of painting = ₹4.75 per sq m
Cost of paint to cover 63 sq m = ₹(4.75 × 63) = ₹299.25
$\therefore$ Cost of painting the wall is ₹299.25.

3. Area of the rectangle = length × breadth
$\therefore$ Area of the room = (10 × 6) m^2 = 60 m^2
Cost of carpet to cover 1m^2 = ₹35
Cost of carpet to cover 60 m^2 = ₹(35 × 60) = ₹2100
$\therefore$ Cost of carpeting the room is ₹2100.

4. Area of rectangle with length 15 m and breadth 7 m = (15 × 7) m^2 = 105 m^2
Area of square of side 10 m = (10 × 10) m^2 = 100 m^2
Since 105 > 100. $\therefore$ Area of rectangle is bigger.

5. Breadth of forest = Area ÷ Length
= (600 ÷ 40) km = 15 km

6. a. Length of rectangle = 21 m
Breadth of rectangle = 19 m
$\therefore$ Area of rectangle = (21 × 19) m^2 = 399 sq m
So area of the flower bed = 399 sq m

b. Cost of laying 1 sq m of flower bed = ₹12

Cost of laying 399 sq m = ₹(399 × 12) = ₹4788

7. Perimeter of a rectangular figure = 45 cm and breadth = 9 cm

Length of the rectangular figure = $\frac{\text{Perimeter}}{2}$ – breadth = $\frac{45}{2}$ – 9 = 22.5 – 9 = 13.5 cm

∴ Area of rectangular figure = $l \times b$ = 13.5 × 9 = 121.5 sq cm

8. Perimeter of rectangle = 2 (3.4 + 2.3) = 2 × 5.7 = 11.4 cm

Area of rectangle = 3.4 × 2.3 = 7.82 sq cm

Perimeter of square = 4 × 2.7 cm = 10.8 cm

Area of square = 2.7 × 2.7 = 7.29 sq cm

a. No

b. No

9. Area of figure a = 6 m 60 cm × 2 m 30 cm

= 6.6 × 2.3 = 15.18 sq m

Area of figure b = 5 cm 6 cm × 3 m 50 cm

= 5.06 × 3.5 = 17.71 sq m

Difference in Area = 17.71 – 15.18 = 2.53 sq m

Perimeter of figure a = 2 (6 m 60 cm + 2 m 30 cm)

= 17 m 80 cm

Perimeter of figure b = 2(5 m 6 cm + 3 m 50 cm)

= 17 m 12 cm

Difference = 17 m 80 cm –17 m 12 cm

= 0.68 m

(i) Difference in the areas of the rectangles = 2.53 sq m

(ii) Difference in the perimeter of the rectangles = 0.68 m

10. Area of rectangle = length × breadth

⇒ 600 cm^2 = length × 15 cm ⇒ length = 600 cm^2 ÷ 15 cm = 40 cm

Exercise 11.5

1. a. Top layer has 2 rows of 6 cubes

Since there is only 1 such layer.

∴ Volume = 2 × 6 × 1 = 12 cu cm

b. Top layer has 2 rows of 6 cubes

Since there are 4 such layers.

∴ Volume = 2 × 6 × 4 = 48 cu cm

c. Top layer has 2 row of 2 cubes

Since there are 2 such layers.

∴ Volume = 2 × 2 × 2 = 8 cu cm

d. Top layer has 2 rows of 3 cubes

Since there are 2 such layers.

∴ Volume = 2 × 3 × 2 = 12 cu cm

e. Top layer has 3 rows of 3 cubes

Since there are 2 such layers.

∴ Volume = 3 × 3 × 2 = 18 cu cm

f. Top layer has 2 rows of 10 cubes

Since there are 3 such layers.

∴ Volume = 2 × 10 × 3 = 60 cu cm

g. Top layer has 5 rows of 5 cubes

Since there are only 5 such layers.

∴ Volume = 5 × 5 × 5 = 125 cu cm

Exercise 11.6

1. Volume of cuboid = length × breadth × height

a. Volume = $(7 \times 4 \times 3)$ cm^3 = 84 cu cm

b. Volume = $(10 \times 7.5 \times 2.8)$ cm^3 = 210 cu cm

c.–d. Similar working as above.

2. Volume of cube = side × side × side

a. Volume = $(4.2 \times 4.2 \times 4.2)$ cu cm = 74.088 cu cm

b. Volume = $(5 \times 5 \times 5)$ cu cm = 125 cu cm

c. Volume = $(7.5 \times 7.5 \times 7.5)$ cu cm = 421.875 cu cm

d. Volume = $(11 \times 11 \times 11)$ cu cm = 1331 cu cm

e. Volume = $(8.5 \times 8.5 \times 8.5)$ cu cm = 614.125 cu cm

3. a. Volume = $(2.5 \times 2.5 \times 1.2)$ cu cm = 7.5 cu cm

b. Volume = $(20 \times 15 \times 10)$ cu cm = 3000 cu cm

c. Volume = $(5.2 \times 5.2 \times 5.2)$ cu cm = 140.608 cu cm

d. Volume = $(8 \times 12 \times 5)$ cu cm = 480 cu cm

e. Volume = $(4 \times 4 \times 4)$ cu cm = 64 cu cm

4. a. Height = $\frac{27}{3 \times 3} = 3$ cm

b. Volume = $(8 \times 5 \times 2)$ cm^3 = 80 cu cm

c. Breadth = $\frac{1200}{10 \times 15} = 8$ cm

d. Length = $\frac{3872}{16 \times 22} = 11$ cm

e. Length = $\frac{756}{3 \times 14} = 18$ m

f. Volume = $(28 \times 15 \times 18)$ cu cm = 7560 cu cm

5. a. Length = 25 m; Breadth = 15 m; Height = 10 m

Volume = $(25 \times 15 \times 10)$ cu m = 3750 cu m

b. Length = 10.2 cm; Breadth = 6.5 cm; Height = 3 cm

Volume of 1 brick = $(10.2 \times 6.5 \times 3)$ cu cm = 198.9 cu cm

c. Volume of cube of side 20 cm = $(20 \times 20 \times 20)$ cm^3 = 8000 cu cm

d. Volume of rectangular piece of wood = $l \times b \times h$

= 120 cm × 78 cm × 13 cm = 121680 cu cm

e. Volume of carton having l = 30 cm, b = 15 cm and h = 20 cm

= $(30 \times 15 \times 20)$ cu cm = 9000 cu cm

Volume of book having l = 5 cm, b = 3 cm, h = 3 cm

= $(3 \times 3 \times 5)$ cu cm = 45 cu cm

Number of books that can fit in the carton = $\frac{(30 \times 15 \times 20)\ cm^3}{(3 \times 3 \times 5)\ cm^3} = 200$

f. Breadth of cupboard = $\frac{V}{l \times h} = \frac{8}{4 \times 2} = 1$ m

g. Depth or height = $\frac{\text{Volume}}{\text{Length} \times \text{Breadth}} = \frac{1176}{12 \times 7} = 14$ cm

h. Volume of cube = 343 cu cm = 7 cm × 7 cm × 7 cm. So, height of the cube = 7 cm.

Test Your Skills

Multiple Choice Questions

1. d. Area of rectangle = length × breadth = 8 cm × 6 cm = 48 sq cm

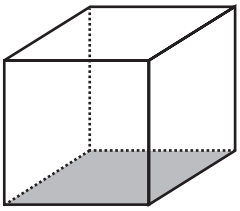
2. b. Volume of a cuboid = length × breadth × height = 11 cm × 9 cm × 7 cm = 693 cu cm

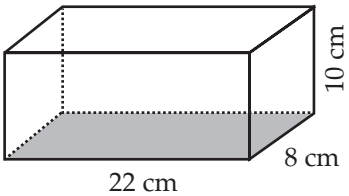
3. a. Breadth of rectangle = $\frac{\text{Perimeter}}{2}$ – Length = $\frac{150}{2}$ – 50 = 75 – 50 = 25 cm

4.–5. Refer answers at the end of the book.

Mental Maths

1.



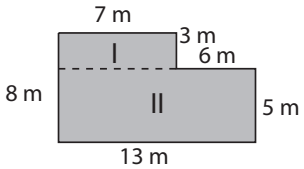


Volume of cubical lunch box = 15 × 15 × 15 = 3375 cu cm

Volume of cuboidal pencil box = 22 × 8 × 10 = 1760 cu cm

∴ Cubical lunch box has greater volume.

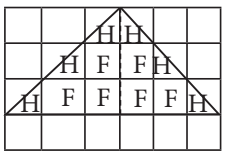
2. Perimeter = 7 m + 3 m + 6 m + 5 m + 13 m + 8 m = 42 m



3. Area of the triangle

$= 6 + \frac{1}{2} \times 6$

$= 6 + 3 = 9$ sq cm



4. Try yourself.

5. Total 8 cuboids can be formed. The dimensions of the cuboids can be

1 × 1 × 36	1 × 6 × 6
1 × 2 × 18	2 × 2 × 9
1 × 3 × 12	2 × 3 × 6
1 × 4 × 9	3 × 3 × 4

Apply Your Skills

Problem Solving Assessment

1. Number of cubes = $\frac{5 \times 4 \times 3 \text{ cu cm}}{1 \text{ cu cm}}$ = 60

2. Volume of the book = Base area × thickness = 125 × 25 = 3125 cu cm

3. Difference of perimeters of two squares = 40 – 32 = 8 cm

Side length = $\frac{8 \text{ cm}}{4}$ = 2 cm

4. a. One side of a Rubik cube's face will be of 6 cm.

Volume = 6 cm × 6 cm × 6 cm = 216 cu cm

b. Area of one face = 6 × 6 = 36 sq cm

Area of two opposite faces = 36 + 36 = 72 sq cm

Value Based Questions

1. Perimeter of Bhura's field = 2(5 m + 4 m) = 2 × 9 = 18 m

Perimeter of Gopu's field = 4 × 6 = 24 m

Length of wire Gopu got = (20 – 18) m = 2 m

Total length of wire with Gopu = 20 m + 2 m = 22 m

Now, wire needed by Gopu = 24 m – 22 m = 2 m

Value: Friendship

2. Area of playground = 25 × 25 = 625 sq m

Cost of maintaining the park per month = 625 × ₹10 = ₹ 6250

Cost of annual maintenance = ₹6250 × 12 = ₹75,000; **Value:** Societal responsibility

3. Volume of chocolate bar = 32 × 16 × 8 = 4096 cu cm

Volume of cubes = $\frac{4096}{8}$ = 512 cu cm

Length of each cube = 8 cm; (as 8 × 8 × 8 = 512 cu cm)

Value: Sharing and caring.

HOTS

1. Difference in volume = 4 × 4 × 4 – 4 × 3 × 5

= 64 – 60 = 4 cu m

Since the cubical tank has more volume, 4 cu m more water is required.

2. Volume of water in tank = 35 × 30 × 15 cu cm = 15750 cu cm

= 15.75 litres (∵ 1000 cu cm = 1 litre)

3. a. Area of the path = Area of outer square – Area of inner square

Side of inner square = 13 m

Side of outer square = (13 + 1 + 1) m = 15 m

Now,

Area of path = (15 × 15) m^2 – (13 × 13) m^2

= (225 – 169) m^2 = 56 m^2

b. Cost of laying 1m^2 of path = ₹15

Cost of laying 56 m^2 of path = ₹(56 × 15) m^2 = ₹ 840.

CHAPTER 12

Metric Measures

Lesson Plan

OBJECTIVES

The students should know about

(i) Measurement of length
(ii) Conversion of units of length
(iii) Decimal operations on units of length
(iv) Measurement of weight
(v) Measurement of capacity
(vi) Mapping skills

Prerequisite Knowledge: The students should have the basic knowledge of measuring the length and the units as they have studied in their previous classes.

Teaching Aids: Writing board, marker, chalks, charts, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics and subtopics of this chapter will be taught in the class.

(i) **Measurement of length**
   (a) Bigger unit of length = kilometre (km)
   (b) Smaller unit of length = metre (m)

1 km = 1000 m

(ii) **Decimal operation on length**

2 km 750 m = 2.750 km

(iii) **Measurement of weight**
   (a) The bigger unit of weight = kilogram (kg)
   (b) The smaller unit of weight = gram (g)

1 kg = 1000 g

(iv) **Decimal operation on weight**

2 kg 350 g = 2.350 kg

(v) **Measurement of capacity**
   (a) Bigger unit of capacity = kilolitre (kL)
   (b) Smaller unit of capacity = litre (L)

1 kL = 1000 L

(vi) **Decimal operation on capacity**

5 kL 715 L = 5.715 kL

(vii) **Conversion of bigger units to smaller units**

$$52 \text{ km} = 52 \times 1000 \text{ m} = 52000 \text{ m}$$
$$5 \text{ kg} = 5 \times 1000 \text{ g} = 5000 \text{ g}$$
$$10 \text{ kL} = 10 \times 1000 \text{ L} = 10000 \text{ L}$$

Recapitulation: The whole chapter will be revised to the students by taking simple examples and their problems will be solved in the class.

Home Assignments

(A) From Textbook

(i) Exercise 12.2—Solve Q. No. 1 to 4 all parts.
(ii) Exercise 12.3—Solve Q. No. 1 to 3 all parts.
(iii) Exercise 12.4—Solve Q. No. 1 to 3 all parts.

(B) Extra Questions

(i) Convert the following bigger units into smaller units.
(a) 150 L 150 mL (b) 20 kg 250 g (c) 350 km 110 m
(ii) If 250 km is represented by 10 cm, then write scale that you would use.

Textbook Solutions

Exercise 12.1

1. a. $5 \text{ mm} = \frac{5}{10} \text{ cm} = 0.5 \text{ cm}$ b. $13 \text{ cm } 7 \text{ cm} = \left(13 + \frac{75}{10}\right) \text{ cm} = 13.7 \text{ cm}$

c–f. Simple working as above.

2. a. $75 \text{ cm} = \frac{75}{100} \text{ m} = 0.75 \text{ m}$ b . $2 \text{ m } 75 \text{ cm} = \left(2 + \frac{75}{100}\right) \text{ m} = 2.75 \text{ m}$

c–f. Simple working as above.

3. a. $35 \text{ cm} = \frac{35}{100} \text{ m} = 0.35 \text{ m}$ b . $25 \text{ km} = 25 \times 1000 \text{ m} = 25000 \text{ m}$

c. $8 \text{ m } 60 \text{ cm} = (8 \times 100 + 60) = 860 \text{ cm}$ d. $9 \text{ mm} = \frac{9}{10} \text{ cm} = 0.9 \text{ cm}$

e. $1250 \text{ m} = \frac{1250}{1000} \text{ km} = 1.250 \text{ km}$

4. a. Akshay's height = Ruchi's height + 50 cm

$$= 1.25 \text{ m} + 50 \text{ cm} = 1.25 \text{ m} + \frac{50}{100} \text{ m} = 1.25 \text{ m} + 0.50 \text{ m} = 1.75 \text{ m}$$

b. Difference in heights = 175 m 75 cm – 112 m 50 cm
= 175.75 m – 112.50 m = 63.25 m

c. Total length of wire used by electrician
= 12 m 25 cm + 8 m 80 cm + 15 m 30 cm
= 12.25 m + 8.80 m + 15.50 m = 36.35 m

d. Distance Sushant walked in the month of April
= 3 km 750 m × 30 = 3.750 × 30 km
= 112.5 km

e. Length of the pole = 5.25 m × 5 = 26.25 m

f. ∵ Length of 10 mobile phones = 1 m 50 cm = 150 cm

∴ Length of 1 mobile phone = 150 cm ÷ 10 = 15 cm.

g. ∵ Thickness of 100 door mats = 98 cm

∴ Thickness of 1 door mat in mm = 98 cm ÷ 100 = 980 mm ÷ 100 = 9.8 cm

(∵ 1 cm = 10 mm)

Exercise 12.2

1. a. 1.5 kg = 1.5 × 1000 g = 1500 g

b. 12.576 kg = 12.576 × 1000 g = 12576 g

c. 0.01 kg = 0.01 × 1000 g = 10 g

2. a. 150 g = 150 ÷ 1000 kg = 0.150 kg

b. 350 g = 350 ÷ 1000 kg = 0.350 kg

c. 3500 g = 3500 ÷ 1000 kg = 3.5 kg

3. a. 75 mg = $\frac{75}{1000}$ g = 0.075 g

b. 250 mg = $\frac{250}{1000}$ g = 0.250 g

c. 5 g 240 mg = $\left(5 + \frac{240}{1000}\right)$ g = 5.240 g

d–g. Similar working as above.

4. a. 40 g = $\frac{40}{1000}$ kg = 0.040 kg

b. 715 dag = $\frac{715}{100}$ kg = 7.15 kg

c. 2375 g = $\frac{2375}{1000}$ kg = 2.375 kg

d–f. Similar working as above.

5. a. Total weight of the bag = 2.050 kg + 0.375 kg + 1.250 kg = 3.675 kg

b. Roop's weight = 25 kg 725 g = 25.725 kg

Roop's weight = 30 kg 250 g = 30.250 kg

Difference in weights = 30.250 kg – 25.725 kg = 4.525 kg

Anwar has more weight than Roop by 4.525 kg.

c. Similar working as above.

d. Total icesticks in a packet = 20; weight of the stick = 75 g = 0.075 kg

Weight of the packet = 20 × 0.075 kg = 1.5 kg

e. Total pencils in a box = 12

Weight of one pencil = 250 mg

Weight of 12 pencils = 12 × 250 mg = 3000 mg = $\frac{3\cancel{000}}{1\cancel{000}}$ = 3 g

f. ∵ Weight of 5 books = 13.650 kg

∴ Weight of 1 book = (13.650 ÷ 5) kg = 2.730 kg

g. Similar working as above.

Exercise 12.3

1. a. 220 mL = $\frac{220}{1000}$ L = 0.220 L

b. 250 L 150 mL = 250 L + 150 mL = 250 L + $\frac{15\cancel{0}}{100\cancel{0}}$ L = (250 + 0.150) L = 250.150 L

c–f. Similar working as above.

2. a. $45000 \text{ dL} = \frac{4500\cancel{0}}{1\cancel{0}} \text{ L} = 4500 \text{ L}$

b. $3400 \text{ dL} = \frac{340\cancel{0}}{1\cancel{0}} \text{ L} = \frac{340}{1000} \text{ kL} = 0.34 \text{ kL}$

c. $750 \text{ L} = \frac{75\cancel{0}}{1\cancel{0}} \text{ daL} = 75 \text{ daL}$

d. $15000 \text{ L} = \frac{150\cancel{00}}{1\cancel{00}} \text{ hL} = 150 \text{ hL}$

e. $4200 \text{ mL} = \frac{42\cancel{00}}{10\cancel{00}} \text{ L} = 4.2 \text{ L}$

f–h. Similar working as above.

3. a. Quantity of water contained in two buckets = (14750 + 12895) mL

= 27645 mL = 27 L 645 mL

or, $\frac{27645}{1000} \text{ L} = 27.645 \text{ L}$

b. Total quantity of milkshake = 250 mL + 500 mL + 1050 mL

$= 1800 \text{ mL} = \frac{1800}{1000} \text{ L} = 1.8 \text{ L}$

c. Quantity of diesel left in the drum

= 500 L – 225.500 L = 274.500 L

= 274 L 500 mL

d. Differences in litre = (6.356 – 2.538) L = 3.818 L.

e. Water in 15 watermelons = 15 × 250 mL = 3750 mL = 3.750 L

f. Juice in 8 glasses = 8 × 225 mL = 1800 mL

Juice left in the jug = 225 mL

Quantity of juice a Jug can hold = 1800 mL + 225 mL = 2025 mL = $\frac{2025}{1000}$ L = 2.025 L

g. 2 L 250 mL = 2250 mL

A packet of 10 Juice pack contains 2250 mL of juice.

Packet of 1 Juice pack contains = $\frac{225\cancel{0}}{1\cancel{0}}$ mL = 225 mL

h. Quantity of diesel in a can = 45 L 250 mL = 45250 mL

Quantity of diesel need for a generator = 5 L = 5000 mL

Time taken to filled up generator from the can = $\frac{\cancel{45250}^{905}}{\cancel{5000}_{100}} = \frac{905}{100} = 9.05 = 9$ times (approx.)

Exercise 12.4

Refer answers at the end of the book.

Apply Your Skills

Problem Solving Assessment

Refer answers at the end of the book.

Test Your Skills

Multiple Choice Questions

1–5. Refer answers at the end of the book.

Value Based Questions

1. Total health drink made by Sambhav and his friends = 20 L

Health drink needed to distribute among 60 children = 60 × 375 mL = 22500 mL = 22.500 L

No, health drink is not enough for distribution.

Health drink needed more for street children = 22.5 L – 20 L = 2.5 L

Value: Social responsibility.

2.

Blanket 'A'	**Blanket 'B'**
Weight of blanket = 2 kg 50 g	Weight of blanket = 2 kg 225 g
Cost of 1 kg = ₹ 500	Cost of 1 kg = ₹ 475
Cost of 2 kg 50 g = ₹ 1025	Cost of 2 kg 225 g = ₹ 1056.87

Blanket 'A' will be cheaper for distribution.

Amount needed for distribution of 100 blankets = ₹ 1025 × 100 = ₹ 102500

Value: Humanitarian aids.

HOTS

1. Ingredients used to bake the cake = 750 g + 1 kg + 1 kg + 250 g = 3 kg

Number of Wednesday and Sundays in a month = 4 + 5 = 9

Total weight of ingredients used to bake the cake in a month = 3 × 9 = 27 kg

2. Case I.

Side of square flower bed = 5 m 25 cm = 5.25 m

Perimeter of each flower bed = 4 × 5.25 m = 21 m

Length of fencing wire used in fencing of 4 squares = 4 × 21 m = 84 m

Length of wire left with David = 100 m – 84 m = 16 m

Case II.

Length of Dolly's house = 25 m 57 cm = 25.57 m

Breadth of her house = 15 m 38 cm = 15.38 m

Perimeter of the house = 2 × (25.57 + 15.38) m = 2 × 40.95 m = 81.90 m

Length of wire left with Dolly = 100 m – 81.9 m = 18.1 m

Difference between the remaining wires = 18.1 – 16 m = 2.1 m

Thus, Dolly had 2.1 m more wire than David.

3. A water tank is filled with water by 1st pipe = 2 L 400 mL per min.

A water tank is filled wth water by 2nd pipe = 1 L 600 mL per min.

Therefore, the tank is filled at the rate of 2.4 L + 1.6 L = 4 L per min.

But water is leaking at the rate of 80 mL = 0.08 L per min

So in 1 minute, water filled exactly in the tank = 4 L – 0.08 L = 3.92 L

So in 4 h = 240 min, water filled in the tank = 240 × 3.92 L = 940.8 L

Thus, the capacity of the tank = 940.8 L

Mental Maths

1–4. Refer answers at the end of the book.

5. As 13 m 40 cm = 13.4 m ($\because$ 1 m = 100 cm)
and 28 m 25 mm = 28.025 m ($\because$ 1000 mm = 1 m)
Difference = 28.025 – 13.4 m = 14.625 ≠ 15.15 m
Hence the statement is false.

CHAPTER 13

Time and Temperature

Lesson Plan

OBJECTIVES

The students should know about
(i) Time and duration of time
(ii) Addition, subtraction, multiplication and division of time
(iii) Reading time tables
(iv) Temperature and its measurement
(v) Conversion of temperature

Prerequisite Knowledge: The students should have the basic knowledge of the measurement of time as they have studied in their previous classes.

Teaching Aids: Writing board, marker, Chalks, Chart, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics and sub-topics of this chapter will be taught in the class.

(i) **Time:**

1 minute = 60 seconds
1 hour = 60 minutes
1 day = 24 hours
1 week = 7 days
1 month = 28/29/30/31 days depending on the years.
1 year = 365/366 days

(ii) **Addition and subtraction of time:**

(a) **Addition:**

h	min	sec
3	50	45
+ 4	25	20
7	75	65

Here 65 s = (60 + 5) s
= 1 min + 5 s
75 min = (60 + 15) min
= 1 hr + 15 min
$\therefore$ 7 hr 75 min 65 s = 7 hr + (1 hr + 15 min) + (1 min + 5 s)
= 8 hr 16 min 5 s

(b) **Subtraction:** 5 h 56 min – 2 h 34 min

$\Rightarrow$

5 h	56 min
–2 h	34 min
3 h	22 min

(iii) **Duration of time:**

(a) am = Ante meridiem (from 12 o'clock at night to noon 12 o'clock in the day)

(b) pm = Post meridiem (From noon to mid night)

(iv) Reading of time table used in Railways and Airlines will be taught taking suitable examples.

Recapitulation: The whole chapter will be revised to the students by group discussion and their problems will be solved in the class accordingly.

Home Assignments

(A) From Textbook

(i) Exercise 13.1—Solve Q. No. 1 to 4 all parts

(ii) Exercise 13.2—Solve Q. No. 1 to 2 all parts

(iii) Exercise 13.3—Solve Q. No. 1 to 5 all parts

(B) Extra Questions

(i) Add: 5 h 30 m 75 s + 2 h 40 m 30 s

(ii) What will be the time 3 hours 30 minutes before 9:00 pm?

(iii) How many days you can calculate from May 15 to July 16?

Textbook Solutions

Exercise 13.1

1. a. $7 \times 60 = 420$ min

b. $4 \times 60 + 25 = 240 + 25 = 265$ min

c. $18 \times 60 = 1080$ s

d. $13 \times 60 + 20 = 800$ s

e. $5 \times 12 = 60$ h

f. $2 \times 7 \times 24 + 4 \times 24 = 432$ hours

g. $3 \times 14 = 42$ days

h. $10 \times 12 + 9 = 129$ months

i. $8 \times 366 = 2928$ days

2. a. $240 \text{ sec} = \frac{240}{60} = 4$ min

b. $1800 \text{ min} = \frac{1800}{60} = 30$ hours

c. $315 \text{ sec} = \frac{315}{60} = 5$ min 15 s

d. $648 \text{ min} = \frac{648}{60} = 10$ hours 48 min

e. $156 \text{ hours} = \frac{156}{24} = 6$ days 12 hours

f. $72 \text{ days} = \frac{72}{30} = 2$ months 12 days

g. $2044 \text{ days} = \frac{2044}{365} = 5$ years 219 days

$$\begin{array}{r} 5 \leftarrow \text{min} \\ 60\overline{)315}(\\ -30 \\ \hline 15 \leftarrow \text{s} \end{array} \qquad \begin{array}{r} 10 \leftarrow \text{h} \\ 60\overline{)648}(\\ -60 \\ \hline 48 \leftarrow \text{min} \end{array}$$

$$\begin{array}{r} 6 \leftarrow \text{days} \\ 24\overline{)156}(\\ -144 \\ \hline 12 \leftarrow \text{h} \end{array} \qquad \begin{array}{r} 2 \leftarrow \text{months} \\ 30\overline{)72}(\\ -60 \\ \hline 12 \leftarrow \text{days} \end{array}$$

$$\begin{array}{r} 5 \leftarrow \text{years} \\ 365\overline{)2044}(\\ -1825 \\ \hline 219 \leftarrow \text{days} \end{array}$$

3–4. Refer answers at the end of the book.

Exercise 13.2

1. a.

	h	min
	2	30
+	1	25
	3	55

Sum = 3 h 55 min

b.

	h	min
		(1)
	4	18
+	7	26
	11	44

Sum = 11 h 44 min

c.

	h	min
		(1)
	9	38
+	6	28
	15	66

$\Rightarrow$

	h	min
	15	66
		− 60
	16	06

Sum = 16 h 6 min

d.

	h	min
	7	32
+	6	24
	13	56

Sum = 13 h 56 min

e.

	h	min	s
	10	55	40
+	6	15	26
	16	70+1	66
		− 60	− 60
	17	11	6

Sum = 17 h 11 min 6 s

f.

	h	min	s
	8	34	36
+	12	34	45
	20	68+1	81
		− 60	− 60
	21	9	21

Sum = 21 h 9 min 21 s

In c., e. & f since minutes are more than 60, we subtract 60 minutes from minutes and add 1 hour (60 min) to hours.

2. a.

	h	min
	5	56
−	1	34
	4	22

Difference = 4 h 22 min

b.

	h	min
	5	2 (1)3
−	2	1 4
	3	1 9

Difference = 3 h 19 min

c.

	h	min
	7	(60)
	~~8~~	22
−	4	45
	3	37

(60 + 22 = 82)

Difference = 3 h 37 min

d.

	h	min
	5	(60)
	~~16~~	15
−	8	55
	7	20

(60 + 15 = 75)

Difference = 7 h 20 min

e.

	h	min	s
	3	(60)	
	~~4~~	18	68
−	2	32	34
	1	46	34

(60 + 18 = 78)

Difference = 1 h 46 min 34 s

f.

	h	min	s
		(54)	(25 + 60)
	9	~~55~~	~~25~~
−	5	43	40
	4	11	45

Difference = 4 h 11 min 45 s

In c., d., e. & f., we borrow 1 h (60 min) from hours column and add to the minutes column of minuend.

Exercise 13.3

1. a. Time lapsed from 3:00 pm to 7:00 pm

$$\begin{array}{r} 7:00 \\ -3:00 \\ \hline 4:00 \end{array}$$ or 4 hours

b.
$$\begin{array}{r} 5:00 \\ -4:00 \\ \hline 1:00 \end{array}$$ or 1 hour

c.
$$\begin{array}{r} 9:00 \\ -4:30 \\ \hline 4:30 \end{array}$$ or 4 hours 30 min

d.
$$\begin{array}{r} 8:00 \\ -6:45 \\ \hline 1:15 \end{array}$$ or 1 hour 15 min

e. 10:00 am to 1:00 pm

Step 1: Subtracting 10:00 am from 12:00 (noon)

$$\begin{array}{r} 12:00 \\ -10:00 \\ \hline 2:00 \end{array}$$

Step 2: Adding 2:00 hours to 1:00 pm (12:00 noon to 1:00 pm)

$$\begin{array}{r} 1:00 \\ +2:00 \\ \hline 3:00 \end{array}$$ or 3 hours

f. 8:00 pm and 6:30 am

Step 1: Subtracting 8:00 pm from 12:00 midnight

$$\begin{array}{r} 12:00 \\ -8:00 \\ \hline 4:00 \end{array}$$

Step 2: Adding 4:00 hours to 6:30 am (12:00 midnight to 6:30 am)

$$\begin{array}{r} 4:00 \\ +6:30 \\ \hline 10:30 \end{array}$$ or 10 hours 30 min

2. a.

	h	min
Rain on 1st day =	3	50
Rain on 2nd day =	4	30
Rain on 3rd day =	+2	40
	9 (+2)	120 (60 + 60)
		−120
Total no. of hours =	11	00

= 11 hours

b.

	h	min
Schedule arrival of train =	5	20
Train was late by =	+3	45
Expected arrival of train =	8 (60)	65
	−	60
	9	05

= 9:05 pm

c.

	h	min
Time of dance class =	1	40
Time of music class =	.	50
Time of yoga class =	1	15
A girl spends total time =	2 h	105 min

= 3 h 45 min

d. Time after 8:50 pm = 8 h 50 min + 4 h 20 min
= 12 h 70 min
= 12 h + 1 h + 10 min = 13 h 10 min
= 13:10 am or 1:10 am

e. Duration of the movie = 2 h 30 min (60 + 30 = 90)
Duration of 1st half = – 55
Duration of the 2nd half = 1 35

	h	min
	1	60
	~~2~~	30
–		55
	1	35

= 1 h 35 min

f. The show ended at = 3 : 40 pm
The show started at = – 2 : 00 pm
Duration of the show = 1 : 40 pm

= 1 h 40 min

g. More time taken by car = 8 h 15 min – 6 h 30 min
= 1 h 45 min

	h	min
	7	60 + 15
	~~8~~	~~15~~
–	6	30
	1	45

h. Time from 5 : 20 pm to 12 midnight = 12:00 – 5:20 = 6 h 40 min
Time from 12 midnight to 7:35 am = 7 h 35 min
Duration of journey = 6 h 40 min + 7 h 35 min
= 13 h 75 m = 14 h 15 min

i. 3 h 30 min before 9:00 pm = 5:30 pm

	h	min
	8	60
	~~9~~	~~00~~
–	3	30
	5	30

j. No, including both 8th April and 23rd April, we get 16 days.

k. Reshma's school opens on = 25th March + 73 days
= 25th March + 7 days + 60 days + 6 days
= 25th March + 7 days (March) + 30 days (April)
+ 31 days (May) + 6 days (June)
= 6th June

Exercise 13.4

1. a. 8:50 – 7:10 = 1:40 or 1 h 40 min

b. 11:30 – 7:10 = 4:20 or 4 h 20 min

c. 11:32 – 11:30 = 00:02 or 2 min

d. 11:32 + 00:40 = 12:12 pm

e. $\begin{array}{r} \overset{8}{\cancel{9}}\,\overset{60}{0} \\ 9:40 \\ -\ 8:53 \\ \hline 00:47 \end{array}$

Time between 9:40 to 9:00 = 40 min

Hence, total time = (40 + 7) = 47 min

f. $\begin{array}{r} 9:45\ \text{am} \\ -\ 9:40\ \text{am} \\ \hline 0:05\ \text{min} \end{array}$

Train stops at Agra for 5 minutes

g. Delhi (7:10 – 7:00 = 10 min)

h. $\begin{array}{r} 9:40 \\ -\ 7:10 \\ \hline 2:30 \end{array}$ or 2 h 30 min

i. $\frac{1}{2}$ h = 30 min

∴ Train will reach Agra at (9:40 + 0:30) am

$\begin{array}{r} 9:40\ \text{am} \\ +\ 0:30\ \text{am} \\ \hline 10:10\ \text{am} \end{array}$ (70 min = 1 min 60 s)

2–3. Refer answers at the end of the book.

Exercise 13.5

1. a. $10°C = \frac{10 \times 9}{5} + 32 = \frac{90}{5} + 32 = 50°F$

b. $24°C = \frac{24 \times 9}{5} + 32 = 43.2 + 32 = 75.2°F$

c. Similar working as above.

2. a. $59°F = \frac{(59 - 32) \times 5}{9} = 15°C$

b. $86°F = \left(\frac{86 - 32}{9}\right) \times 5 = 30°C$

c. Similar working as above.

3. Increase in temperature = 100.5°F – 82.5°F = 18°F

4. Decrease in temperature = 101.8°F – 99.2°F = 2.6°F

5. As 38.5°C > 35.8°C, statement (b) is correct.

6. Temperature on Saturday = 32.5°C + 2.2°C = 34.7°C

7. Temperature in June = 40.5°C – 3.6°C = 36.9°C

Test Your Skills

Multiple Choice Questions

1–5. Refer answers at the end of the book.

Mental Maths

1. Time = 12:00 – 5 h 15 min
= 6 : 45 am

	h	min
	11	60
	~~12~~	~~00~~
–	5	15
	6	45

2. Mercury.

3. Difference = 13:50:25 – 8:12:36
= 5:37:49

	h	min	s
		49	85
	13	~~50~~	~~25~~
–	8	12	36
	5	37	49

4. Number of days between 4830 days and 2970 days = (4830 – 2970) – 1 = 1859

$$365\overline{)1859}\ (5,\ -1825,\ 34$$

1859 days = $\frac{1859}{365}$ = 5 years 34 days. But, out of 4 years, there is a leap year.
Hence 1859 days = 5 years 1 month 3 days

5. From the Trip Maninder returned = 12th Sep. 6:30 am + 14 days + 4 days + 13 h + 15 min
= 30th Sep 6:30 am + 13 h 15 min = 30th Sep 19:45 hours, i.e., 30th Sep 7:45 pm

Apply Your Skills

Problem Solving Assessment

1. Time at Johannesburg = 9:30 am – 3 h 30 min = 6:00 am
Time at Sydney = 9:30 + 5 h 30 min = 3 pm

2. Refer answers at the end of the book.

3. Time taken = 23rd March 11:30 am + 24th March + 25th March 3:00 pm
= 24:00 – 11:30 am + 1 day + 12:00 + 3:00 pm
= 12 h 30 min + 1 day + 15 h
= 1 day + 27 h 30 min
= 1 day + 1 day + 3 h 30 m
= 2 days 3 h 30 min

4. Number of days = May (24) + April (30) + March (31)
+ February (29) + January (31) + December (31) + November (13 days)
= 17th November; Employee joined the office on 17/11/2015.

5. Refer answers at the end of the book.

Value Based Questions

1. (a) Time spent by Yogita in a month = 30 min × 30 = 15 h

(b) Time spent by Yogita in a year = 30 min × 365 = 10950 min = 182 h 30 min

Value: Care for elder.

2. 20 days earlier to 15th April = 5 days in the month of March

= 31 – 5 = 26th March

Value : Sincerity.

HOTS

1. Rate of heart beat = 72 beats per min.

Number of minutes in a day = (24 × 60) = 1440 min.

Heart beat taking place in a day = (72 × 1440) beats = 103680 beats

2. Time taken by Mrs Webb to walk her dog once = 15 min

Since she takes her dog for walk a day.

∴ Time spent in a day = (2 × 15) = 30 min.

Days in a week = 7

Days in 4 weeks = 7 × 4 = 28

∴ Time spent by Mrs Webb in four weeks = (28 × 30) min = 840 min.

3. Time taken to walk to the bus stop = 3 min.

Number of days required for travelling 60 min walk = 60 ÷ 3 = 20 days

4. Time spent on jogging in each day = 30 min

24 hours of jogging = (24 × 60) min = 1440 min

Number of days required to jog = 1440 min

= 1440 ÷ 30 = 48 days

CHAPTER 14

Money

Lesson Plan

OBJECTIVES

The students should know about

(i) Unitary method
(ii) Bills and the contracts of the bill
(iii) Profit and Loss
(iv) Cost price and Selling price
(v) Word problems

Prerequisite Knowledge: The students should have the basic knowledge of unitary method, CP and SP, profit and loss as they have studied in their previous classes.

Teaching Aids: Writing board, marker, chalks, charts, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics and sub-topics of the chapter will be taught in the class.

(i) **Unitary Method:** In this method, the value of one item is determined and then it is multiplied by the number of required items.

Example: Cost of 15 bananas = ₹ 60

Cost of 1 banana = ₹ 60 ÷ 15 = ₹ 4

Cost of 8 banana = ₹ 4 × 8 = ₹ 32

(ii) **Bills:** Whenever we buy any item from a shop, the shopkeeper gives us a bill.

(iii) Bills contain the following information.

(a) Name and address of the shop

(b) Date of purchase

(c) Bill number

(d) Rate per unit

(e) Number of items purchased

(iv) CP = Cost price, SP = Selling price

(v) Profit = SP – CP and Loss = CP – SP

(vi) Some practical questions will be solved in the class.

Recapitulation: The whole chapter will be revised to the students involving the students and their problems will be solved accordingly in the class.

Home Assignments

(A) From Textbook

(i) Exercise 14.1—Solve Q. No. 1 all parts

(ii) Exercise 14.2—Solve Q. No. 1 to 3 all parts

(iii) Exercise 14.3—Solve Q. No. 1 to 2 all parts

(B) Extra Questions

(i) Find the selling price if CP = ₹ 30.75 and loss = ₹ 3.25.

(ii) The cost of 1 dozen items is ₹ 48. Find the cost of 5 similar type of items.

Textbook Solutions

Exercise 14.1

1. Find the cost of 1 item in each case and then compare to find out which is cheaper.

2. a. 1 dozen = 12 items

Cost of 12 bananas = ₹48

Cost of 5 dozen bananas = 5 × 48 = ₹240

b. Savings of 8 months = ₹48000

Savings of 1 month = ₹48000 ÷ 8 = ₹6000

Mohan saves ₹6000 in a month.

e. 1 dozen = 12
Cost of 1 dozen oranges = ₹24
Cost of 1 orange = ₹24 ÷ 12 = ₹2
Cost of 15 oranges = ₹2 × 15 = ₹30

f. Cost of 16 books = ₹640
Cost of 1 book = ₹640 ÷ 16 = ₹40
Cost of 9 books = ₹40 × 9 = ₹360
Cost of 9 books is ₹360.

g. Money saved in 1 month = ₹10,000
Money saved in 12 months = ₹10,000 × 12 = ₹1,20,000; Shyam saves ₹ 1,20,000 in one year.

c–d. Similar working as above.

Exercise 14.2

1. a. Rita's bill

Banana = 3 × 45	= ₹135
Apples = 5 × 110	= ₹550
Mangoes = 2 × 38	= ₹ 76
Total	= ₹761

Rita had to pay ₹761.

b. Raman had to pay = 2 × 80 = ₹160.00

c. Alok's bill

Watermelons = 4 × 20	= ₹80.00
Lychees = 6 × 100	= ₹600.00
Total	= ₹680.00

Alok had to pay ₹680.00.

d. Madhvi's bill

Bananas = 2 × 45	= ₹ 90.00
Mangoes = 2.5 × 38	= ₹ 95.00
Chikoos = 0.5 × 35	= ₹ 17.50
Apples = 1.5 × 110	= ₹165.00
Total	= ₹367.50

Madhvi had to pay ₹ 367.50.

2–3. Refer answers at the end of the book.

Exercise 14.3

1. Profit = SP – CP and Loss = CP – SP

a. SP > CP ∴ Profit = ₹(900 – 800) = ₹100

b. CP > SP ∴ Loss = ₹(18.00 –16.50) = ₹1.50

c. CP > SP ∴ Loss = ₹(200 – 175) = ₹25

d. SP > CP ∴ Profit = ₹(149.50 – 132.75) = ₹16.75

e. SP > CP ∴ Profit = ₹(141.00 – 132.25) = ₹8.75

f. CP > SP ∴ Loss = ₹(435.75 – 375.25) = ₹60.50

2. a. CP of camera = ₹3258; SP of camera = ₹3500

$\because$ SP > CP

$\therefore$ Profit = ₹ (3500 – 3258) = ₹242

b. Mona purchased scooty for = ₹30,682

SP of scooty = ₹30,500

Since CP > SP.

$\therefore$ Loss = (30,682 – 30,500) = ₹182

c. Cost of car = ₹5,40,000

Money spent on repairing = ₹20,000

$\therefore$ CP of car = ₹(5,40,000 + 20,000)

= ₹5,60,000

SP of car = ₹5,87,250

Since SP > CP $\therefore$ Gain = ₹(5,87,250 – 5,60,000) = ₹27,250

d. Total CP of 20 packets of chocolate = ₹(20 × 35) = ₹700

SP of 20 packets = ₹1000

Since SP > CP $\therefore$ Gain = ₹(1000 – 700) = ₹300

e. Cost price of 20 dozen pastries at ₹160 per dozen

= ₹(20 × 160) = ₹3200

SP of pastries at ₹9.50 per pastry

= (9.50 × 12 × 20) = ₹2280

Since CP > SP $\therefore$ Loss = ₹(3200 – 2280) = ₹920

f. Actual cost price = CP + overhead expenses = ₹(6,20,000 + 30,000) = ₹6,50,000

SP = ₹7,00,000

Gain = SP – Actual CP = ₹(7,00,000 – 6,50,000) = ₹50,000

Exercise 14.4

1. As Profit = SP – CP

$\therefore$ CP = SP – Profit and SP = CP + Profit

As Loss = CP – SP

$\therefore$ CP = Loss + SP and SP = CP – Loss

a. SP = CP + Profit = ₹ (500 + 50) = ₹ 550.

b. SP = CP + P $\therefore$ SP = ₹(475.00 + 12.50) = ₹487.50

c. SP = ₹(2235.25 + 30.75) = ₹2266

d. SP = CP – Loss $\therefore$ SP = ₹(1050 – 175) = ₹875

e. SP = CP – Loss = ₹ (1500 – 450) = ₹1050

f. SP = ₹(925.25 – 3.75) = ₹921.50

2. a. CP = SP + Loss $\therefore$ CP = ₹(475 + 35) = ₹510

b. CP = SP – Loss $\therefore$ CP = ₹(900 + 135) = ₹1035

c. CP = ₹(785.25 + 2.75) = ₹788

d. CP = SP – Profit = ₹(750 – 150) = ₹600

e. CP = SP – Profit $\therefore$ CP = ₹(7055.00 – 501.25) = ₹6553.75

f. CP = ₹(435.65 – 12.75) = ₹422.90

3. a. CP of table = ₹550
Profit = ₹120
∴ SP = CP + Profit
SP = ₹(550 + 120) = ₹670

b. CP of TV = ₹9990 and Profit = ₹25450
Since SP = CP + Profit
∴ SP = ₹(9990 + 450) = ₹10440

c. SP of bicycle = ₹4700 and Profit = ₹200
We know that CP = SP – Profit
∴ CP = ₹(4700 – 200) = ₹4500

d. SP of car = ₹1,32,050 and Profit = 10,000
Since CP = SP – Profit
∴ CP = ₹(1,32,050 – 10,000) = ₹1,22,050

e. SP of fan = ₹650 and Loss = ₹300
Since CP = SP + Loss
∴ CP = ₹(650 + 300) = ₹950

f. CP of casio = ₹5000 and Loss = ₹1250
Since SP = CP – Loss
∴ SP = ₹(5000 – 1250) = ₹3750

Test Your Skills

Multiple Choice Questions

1–5. Refer answers at the end of the book.

Mental Maths

1. Distance covered in 1 litre of petrol = $\frac{480}{10}$ = 48 km
Distance covered in 7 litres of petrol = 7 × 48 = 336 km

2. In ₹215, the number of pencil box bought = 5
∴ In ₹645, the number of pencil box bought = $\frac{5}{\cancel{215}} \times \cancel{645}^{3} = 15$

3. CP = ₹525 + ₹75 = ₹600

4. CP = ₹2000 + ₹375 = ₹2375
SP = ₹1850
Loss = ₹2375 – ₹1850 = ₹ 525

5. False, SP = ₹ 800 + ₹150 = ₹ 950

Apply Your Skills

Problem Solving Assessment

1. Price of 1 litre skimmed milk = ₹ $\frac{309.95}{5}$ = ₹61.99
Price of 9 litres of skimmed milk = 9 × ₹61.99 = ₹557.91

2. Price of 1 notebook = ₹ $\frac{306}{6}$ = ₹51

Price of 16 notebooks = ₹51 × 16 = ₹816

Rohit have to pay ₹816.

3. CP of 7 packets = ₹350

SP of 7 packets = 7 × ₹60 = ₹420

Profit = SP – CP = ₹420 – ₹350 = ₹70

4. Money collected in a 1 year = 20 × ₹300 × 12 = ₹72,000

Money collected in 5 years = ₹72000 × 5 = ₹3,60,000

5. Money spent on registers = $\frac{2}{3} \times$ ₹540 = ₹360

Money spent on stickers = $\frac{1}{3} \times$ ₹540 = ₹180

No. of registers = $\frac{₹360}{₹180}$ = 2 dozen = 2 × 12 = 24

No. of stickers = $\frac{₹180}{₹60}$ = 3 dozen = 3 × 12 = 36

Value Based Questions

1. The actual price of the scissor was ₹ 81. By mistake, Namita paid ₹18.

Balance paid by her = ₹81 – 18 = ₹63; **Value:** Honesty

2. CP of 40 kg apples = ₹6000

SP of 40 kg apples = ₹125 × 40 = ₹5000

Loss = ₹6000 – ₹5000 = ₹1000

The shopkeeper has to make a profit of ₹1000 by selling mangoes.

CP of 50 kg mangoes = ₹4000

SP of 50 kg mangoes = ₹4000 + ₹1000 = ₹5000

∴ SP of 1 kg mango = $\frac{₹5000}{50}$ = ₹100

Value: Friendship.

3. CP of 20 registers = ₹500

CP of 1 register = ₹$\frac{\cancel{500}^{25}}{\cancel{20}}$ = ₹25

$\left[\because \begin{matrix} 1 \text{ score} = 20 \\ \text{and } 1 \text{ dozen} = 12 \end{matrix}\right]$

CP of 200 registers = ₹200 × 25 = ₹5000

SP of 1 register = ₹30

SP of 200 registers = ₹200 × 30 = ₹6000

Profit = ₹6000 – ₹5000 = ₹1000

CP of 12 copies = ₹96

CP of 1 copy = $\frac{₹\cancel{96}^{8}}{\cancel{12}}$ = ₹8

CP of 480 copies = ₹480 × 8 = ₹3840

SP of 1 copy = ₹15

SP of 480 copies = ₹15 × 480 = ₹7200

Profit = ₹7200 – ₹3840 = ₹3360

Total profit = ₹3360 + ₹1000 = ₹4360

Lawanya donated ₹4360 to CRY foundation for poor children.

Value: Charity.

HOTS

1. CP of 1 refrigerator = ₹ $\frac{1,20,000}{20}$ = ₹ 6000

SP of 1 refrigerator = ₹6000 + ₹1550 = ₹ 7550

2. There are 8 hundred rupee notes in the paid amount.

∴ No. of 10-rupee notes = 8 ÷ 4 = 2

∴ No. of 20-rupee notes = 2 × 2 = 4

and no. of 50-rupee notes = 2 × 3 = 6

Thus, the grand total of the bill = ₹100 × 8 + ₹50 × 6 + ₹20 × 4 + ₹10 × 2

= ₹800 + ₹300 + ₹80 + ₹20

= ₹1200

CHAPTER 15

Symmetry

Lesson Plan

OBJECTIVES

The students should know about

(i) Symmetry and symmetrical figures

(ii) Types of symmetry

(iii) Symmetry of 3-D figures

(iv) Isometric sketches

(v) Patterns of numbers

(vi) Calendars

Prerequisite Knowledge: The students should have the basic knowledge of symmetrical shapes as they have studied in their previous classes.

Teaching Aids: Writing board, marker, chalks, charts, duster, geometrical box, smart-board/ projector and the pointer.

Method of Teaching: The following topics and sub-topics of this chapter will be explained in the class with some examples.

(i) **Symmetrical figures:** A shape is said to be symmetrical about its axis when one half of it is the mirror image of the other half.

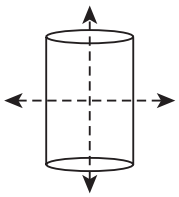
(ii) **Types of symmetry**

a. Rotation

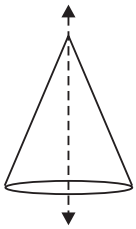
b. Reflection

(iii) **Symmetry of 3-D figures**

a. **Cylinder:** It has two lines of symmetry.

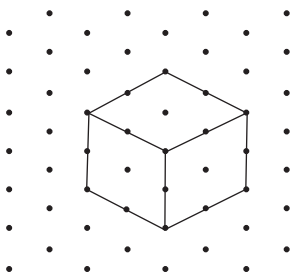


b. **Cone:** It has only one line of symmetry.



We may take many examples of 3-D figures having one or more line of symmetry. For example: cube, cuboid, cup, box, bottle and so on.

(iv) **Isometric Sketches:** The figures that are drawn by joining the dots on a doted paper where dots are placed at equal distances per unit measurement.



Recapitulation: The whole chapter will be revised in the class by involving the students and the problems of the students will be solved immediately.

Home Assignments

(A) From Textbook

(i) Exercise 15.2—Solve Q. No. 1 to 5 all parts

(ii) Exercise 15.5—Solve Q. No. 1 all parts

(iii) Exercise 15.9—Solve Q. No. 1 to 5 all parts

(B) Extra Questions

(i) Use the dot sheet, draw the following figures.

a. A cube of length 2 cm

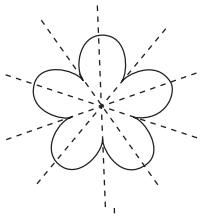
b. A cuboid of length 5 cm, breadth 3.5 cm and height 3 cm.

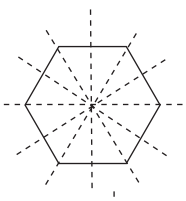
(ii) Draw the following nets.

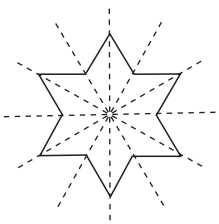
a. Cuboid b. Cylinder c. Cone

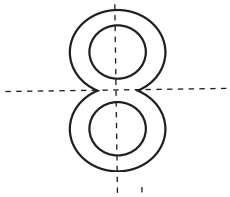
Textbook Solutions

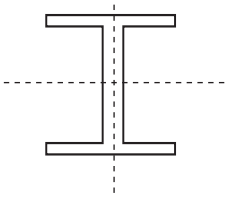
Exercise 15.1

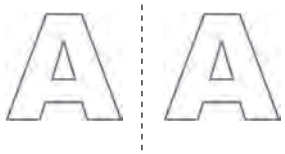
1. a. 

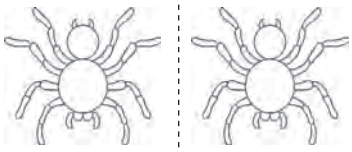
b. 

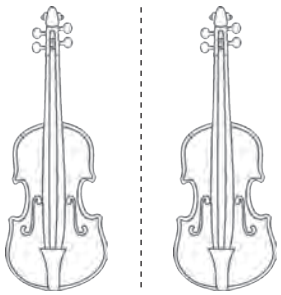
d. 

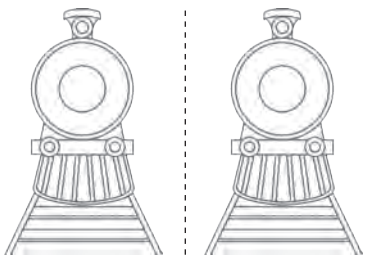
e. 

f. 

2. b. 

c. 

f. 

g. 

3. Refer answers at the end of the book.

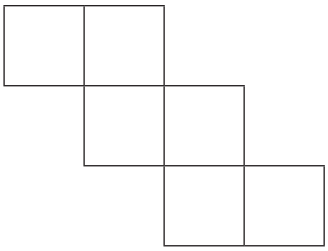
Exercise 15.2 and 15.3

Refer answers at the end of the book.

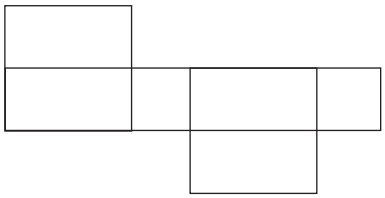
Exercise 15.4

1. a. Dice, chalk box b. An almirah, a refrigerator c. A softdrink can, a gas cylinder

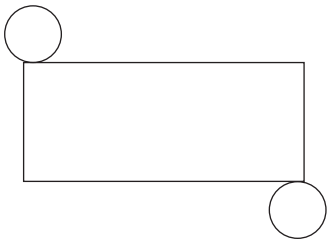
2. a. Net of a cube



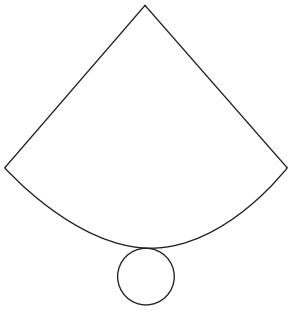
b. Net of a cuboid



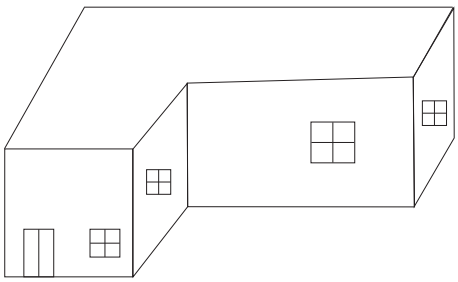
c. Net of a cylinder



d. Net of a cone



3. a.

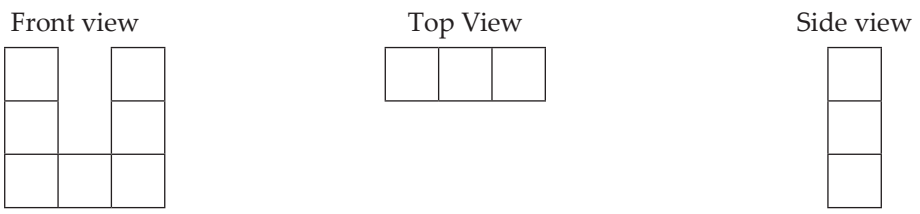


Deep drawing of the house.

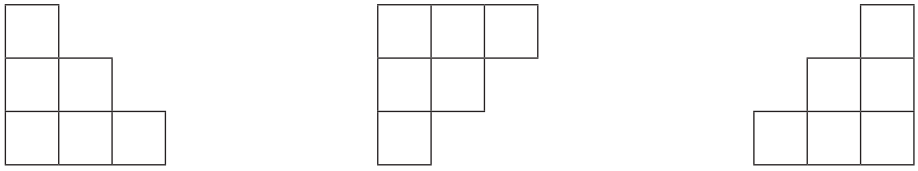
b. 1 window on the left side wall can't be seen.

4–5. Do it yourself.

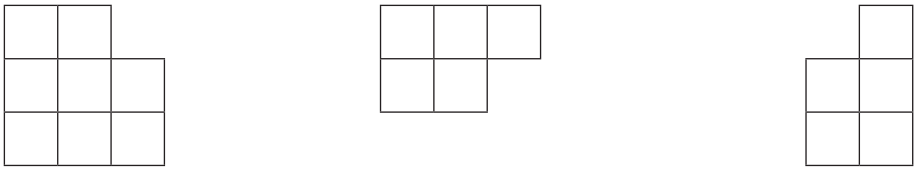
6. a.



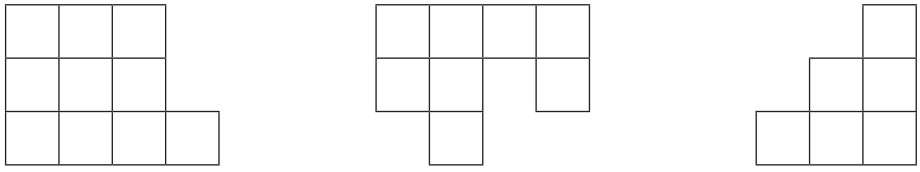
b.



c.



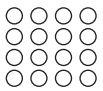
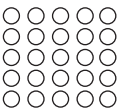
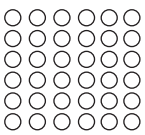
d.



Exercise 15.5-15.6

Do it yourself.

Exercise 15.7

1. a.  b.  c.  d. 

2. Refer answers at the end of the book.

3. a. The sum of 8 odd consecutive numbers = 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 = 8 × 8 = 64

b. The sum of 10 odd consecutive numbers = 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19
= 10 × 10 = 100

4. Refer answers at the end of the book.

Exercise 15.8

1–5. Refer answers at the end of the book.

Exercise 15.9

1. Refer answers at the end of the book.

2. a.
$$\begin{array}{r} 23 \\ +32 \\ \hline 55 \end{array}$$

b.
$$\begin{array}{r} 173 \\ +371 \\ \hline 544 \\ +445 \\ \hline 989 \end{array}$$

c.
$$\begin{array}{r} 257 \\ +752 \\ \hline 1009 \\ +\ 9001 \\ \hline 10010 \\ +01001 \\ \hline 11011 \end{array}$$

3. a.

4	5	6
11	12	13
18	19	20

b.

7	8	9
14	15	16
21	22	23

c.

9	10	11
16	17	18
23	24	25

4. a. Sum of row, column and diagonal is 15.

b. Sum of row, column and diagonal is 30.

c. Sum of row, column and diagonal is 27.

Refer answers for magic squares.

5–6. Refer answers at the end of the book.

Test Your Skills

Mental Maths

1. 37 × 12 = 37 × 6 × 2 = 222 × 2 = 444
37 × 15 = 37 × 3 × 5 = 111 × 5 = 555
37 × 18 = 37 × 6 × 3 = 222 × 3 = 666
37 × 21 = 37 × 3 × 7 = 111 × 7 = 777
37 × 24 = 37 × 6 × 4 = 222 × 4 = 888
37 × 27 = 37 × 9 × 3 = 333 × 3 = 999

2. a. 5th triangular number = $\frac{5 \times 6}{2}$ = 5 × 3 = 15

b. 7th square number = 7 × 7 = 49

3. Refer answers at the end of the book.

4.

6	10	14
8	18	4
16	2	12

5. Refer answers at the end of the book.

Apply Your Skills

Problem Solving Assessment

1. a. As $\frac{1}{2} \times 100 = 50$, number > 50 b. 60 < Number < 70 c. T O
6 5
(5 + 1)

d. Sum = $\frac{1}{10} \times 100 + 1 = 10 + 1 = 11$ (i.e., 6 + 5) $\therefore$ Number = 65

2. Refer answers at the end of the book.

3. As

L	I	B	E	R	A	T	E
↓	↓	↓	↓	↓	↓	↓	↓
5	6	4	0	3	1	7	0

So, a.

T	R	I	B	A	L
↓	↓	↓	↓	↓	↓
7	3	6	4	1	5

b.

B	I	L	A	T	E	R	A	L
↓	↓	↓	↓	↓	↓	↓	↓	↓
4	6	5	1	7	0	3	1	5

c.

I	L	L	I	T	E	R	A	T	E
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
6	5	5	6	7	0	3	1	7	0

d.

T	A	B	L	E
↓	↓	↓	↓	↓
7	1	4	5	0

4. 0 + 3 = 3 + 5 = 8 + 7 = 15 + 9 = 24 + 11 = $\underline{35}$ + 13 = 48

HOTS

1. △ + △ + △ = 18 $\Rightarrow$ 3△ = 18 or △ = 6

□ + ○ + △ = 20 $\Rightarrow$ □ + ○ + 6 = 20

□ + ○ = 14

○ + □ + □ = 17 $\Rightarrow$ 14 + □ = 17

$\Rightarrow$ □ = 17 – 14 = 3

3 + 6 + △ = 20 $\Rightarrow$ △ = 20 – 9 = 11

2. Refer answers at the end of the book.

CHAPTER 16

Data Handling

Lesson Plan

OBJECTIVES

The students should know about

(i) Collection of data
(ii) Tabulation of data
(iii) Bar graph
(iv) Pie chart

Prerequisite Knowledge: The students should have the basic knowledge of data handling as they have studied in their previous classes.

Teaching Aids: Writing board, marker, chalks, chart, duster, geometrical box, smart-board/ projector and the pointer.

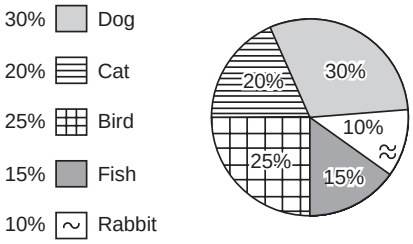
Method of Teaching: The following topics of this chapter will be taught in the class.

(i) **Collection of data:**
  (a) Arranging the data in their increasing or decreasing order.
  (b) Data are tabulated with tally marks and frequency.

(ii) **Pictograph:** Pictograph will be revised in the class as the students have done it in previous class.

(iii) **Bar graph:**
  (a) **Vertical bar graph:** The students have done it in their previous classes. Some examples are to be solved in the class.
  (b) **Horizontal graph:** The students have also done it in their previous classes. The students will be given some examples to solve in the class.

(iv) **Pie chart:** Read the following pie chart and answer the given questions:



  (a) Which pet is liked the most?
  (b) Which pet is liked the least?
  (c) What per cent of people like fish?

Recapitulation: The whole chapter will be revised to the students taking some practical examples and the problems will be solved immediately in the class.

Home Assignments

(A) From Textbook

(i) Exercise 16.1—Solve Q. No. 1 to 4
(ii) Exercise 16.2—Solve Q. No. 1 to 5
(iii) Exercise 16.4—Solve Q. No. 1 to 3

(C) Extra Question

Draw the horizontal bargraph of the following table:

Name of the Drink	Number of People
Tea	150
Coffee	125
Chocolate drink	60
Milkshake	50
Juice	80

Textbook Solutions

Exercise 16.1

Refer answers at the end of the book.

Exercise 16.2

1.–4. Refer answers at the end of the book.

5. a. Wednesday; 20 b. Friday; 90

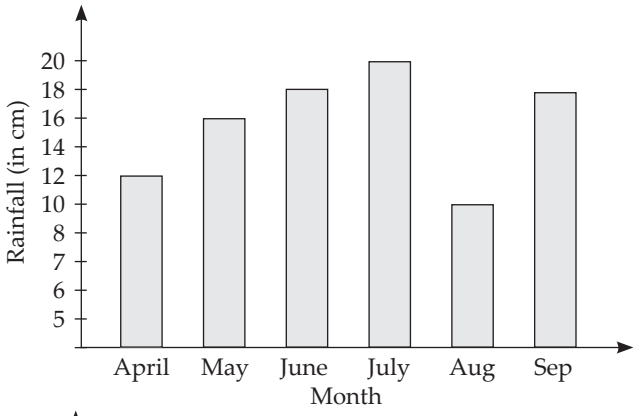
c. Tuesday d. 60

e. Total attendance during the week = (80 + 30 + 20 + 60 + 90) = 280

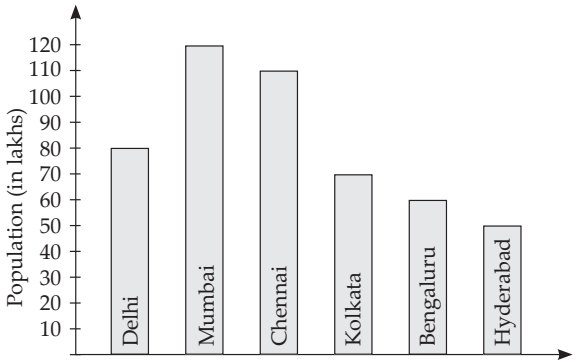
6. Refer answers at the end of the book.

7.–8. Do it yourself.

9.



10.



Exercise 16.3

1. a. Burger b. Sandwich c. Chips
d. (45 – 25)% = 20% e. (20 – 10)% = 10%

2. a. Dogs are liked most by 30%. b. Birds are liked least by 10%
c. 20% d. Dogs and Cats

3. a. 14% b. Foreign c. Drama
d. Comedy and Action; Drama and Science Fiction
e. Horror and foreign
1. Pink 2. Black 3. 55 students 4. Yellow 5. Black, Yellow, Pink

Test Your Skills

Multiple Choice Questions

1–5. Refer answers at the end of the book.

Mental Maths

1.

Colour	Girls	Boys	Total
Black	5	3	8
Blue	2	4	6
Green	4	7	11
Yellow	8	5	13
Pink	9	8	17

Apply Your Skills

Problem Solving Assessment

1.

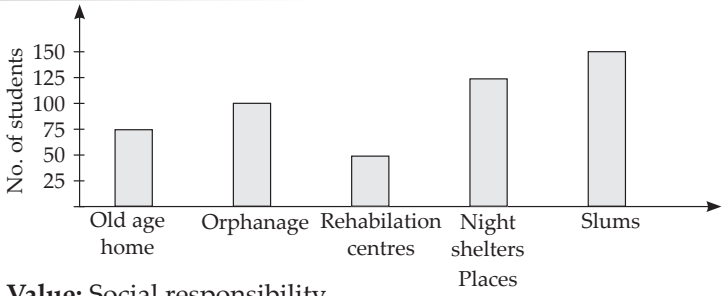
Not wearing helmet	
Red light jumping	
Crossing subway or pedestrian crossing	
Not wearing seatbelts	
Not having pollution certificates	

Scale : 1  = 25 challans issued

a. Red light Jumping b. 150 c. Yes, 175 d. Yes, 100

Value Based Questions

1.



Value: Social responsibility

HOTS

1. Refer answer at the end of the book.

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