1 Knowing Our Numbers

EXERCISE-1.1

1. (a) 35, 312, 3546, 45
   Greatest No. = 3546
   Smallest No. = 35

   (b) 1234, 3045, 8120, 8210
   Greatest No. = 8210
   Smallest No. = 1234

2. (a) 5312, 5785, 708, 9412, 23
   Arrange in assending order:
   23 < 708 < 5312 < 5785 < 9412

   (b) 5045, 4612, 5742, 5746, 472, 47
   Arrange in ascending order:
   47 < 472 < 4612 < 5045 < 5742 < 5746

3. (a) 712, 1515, 546, 7010, 5461
   Arrange in descending order:
   7010 > 5461 > 1515 > 712 > 546

   (b) 760, 7006, 9000, 9007, 21325
   Arrange in descending order:
   21325 > 9007 > 9000 > 7006 > 760

4. (a) Using the digit 0, 2, 6, 9 only once.
   Greatest Number = 9620
   Smallest Number = 2069

   (b) Using the digits 7, 0, 9, 6 only once.
   Greatest No. = 9760
   Smallest No. = 6079

5. (a) Greatest 7-digit even number.
   Greatest 7-digit even number is 9999998.

   (b) The smallest 7-digit odd number.
   Smallest 7-digit odd number is 1000001

   (c) The greatest 4-digit number ending in 1.
   The greatest 4-digit number ending in 1 is 9991.

   (d) The greatest and the smallest 4-digit numbers using different digits.
   • Smallest 4-digit number using differnt digits is 1023
   • Greatest 4-digit number using different digits is 9876.

6. (a) 5, 9, 0

Smallest 4-digit number using 5, 9 ,0 is 5009

(b) 2, 8, 4

Smallest 4-digit number using 2, 8, 4 is 2248

(c) 1, 0, 9

Smallest 4-digit number using 1, 0,9 is 1009.

7. We know that 5-digit number start with 10000 and end with 99999

So, the no. of 5-digit number = (99999 – 10000) + 1 = 89999 + 1 = 90000

8. We know that 7-digit numbers start with 1000000 and end with 9999999

So, the no. of 7-digit numbers = (9999999 – 1000000) + 1 = 8999999 + 1 = 9000000.

EXERCISE-1.2

1. (a) 67, 84, 37, 678

Sixty-seven crore eighty-four lakh thirty-seven thousands six hundred seventy-eight.

(b) 9, 88, 13, 379

Nine crore eighty-eight lakh thirteen thousand three hundred seventy-nine.

(c) 3, 16, 32, 71, 514

Three arab sixteen crore thirty-two lakh seventy-one thousand five hundred fourteen.

(d) 352, 644, 714

Three hundred fifty-two million six hundred forty-four thousands seven hundred fourteen

2. (a) 12, 03, 00, 007

(b) 60, 002, 000

(c) Fifty-four lakh five hundred – 54,00,500

(d) Sixty-nine crore five lakh thirty-three thousand seventy – 69,05,33,070

(e) Nineteen million twelve – 19,000,012

(f) Seventy lakh eighty thousand fifty = 70,80,050

3. (a) 87645003

Indian system :-

8,76,45,003

International system :-

87,645,003

(b) 4570010

Indian system :-

45,70,010

International system

4,570,010

(c) 66006600

Indian system

6,60,06,600

International system

66, 006,600

(b) 25783045

Indian system

2,57,83,045

International system :-

25, 783, 045

4. (a) 80004580

   The place value of 8 in 80004580 are 8,00,00,000 and 80

   The difference between 8,00,00,000 and 80

$$\begin{array}{r} 8,00,00,000 \\ -80 \\ \hline 7,99,99,920 \\ \hline \end{array}$$

   The difference between the place values of 8 in 80004580 is 79999920

   (b) 1807968

   The place value of 8 in 1807968 are 8,00,000 and 8

   The difference between 8,00,000 and 8.

$$\begin{array}{r} 800000 \\ -8 \\ \hline 799992 \\ \hline \end{array}$$

   The difference between the place values of 8 in 1807968 is 799992

5. (a) 678542 ; 459720 ; 609999 ; 610000

   Arrange in descending order

   6,78,542 > 6,10,000 > 6,09,999 > 4,59,720

   (b) 4678265 ; 7864625 ; 6874562 ; 7658462

   Arrange in descending order

   78,64,625 > 76,58,462 > 68,74,562 > 46,78,265

6. Three consecutive number after 5,10,999 are 5,11,000 , 5,11,001 , 5,11,002

7. (a) 2,54,658

   2,54,658 = 2,00,000 + 50,000 + 4,000 + 600 + 50 +8

   (b) 3,00,065

   3,00,065 = 3,00,000 + 60 + 5

   (c) 46,035,006

   46,035,006 = 40,000,000 + 6,000,000 + 30,000 + 5,000 + 6

8. The smallest 8-digit number using seven difference digit are 10023456

   Indian system

   1,00,23,456

   International system = 10,023,456

9. Predecessor of ten lakh is 10,00,000 – 1 = 9,99,999

    = Nine lakh ninety-nine thousand nine hundred ninety-nine

   999,999 = Nine hundred ninety-nine thousand nine hundred ninety-nine

10. The Greatest 7-digit number having only three difference digits is 9999987

    Indian system – 99,99,987 – Ninety-nine lakh nienty-nine thousand nine hundred eighty-seven.

    International system – 9,999,987 – Nine million nine hundred ninety nine thousand nine hundred eighty-seven.

11. No. of magazine published in 2009 =   23,500 copies

    No. of magazine published in 2010 = +   50,900 copies

    No. of magazine published in 2011 = + 1,15,750 copies

              Total No. of magazines =   1,90,150

Ans. The total no. of magazines produced in these three years are 1,90,150.

12.
$$1 \text{ Kg} = 1 \times 1000 \text{ g} = 1000 \text{ g} = 1000 \times 1000 \text{ mg}$$
$$= 10,00,000 \text{ mg.}$$
$$1 \text{ Kg} = 10,00,000 \text{ mg.}$$

13. (i)   The thickness of a mobile phone – Millimetre

(ii)   Distance between two cities – Kilometre

(iii) Water in a glass – Millilitre

(iv) Quantity of rice bought from a grocery shop – Kg

(v)   Length of a room – Metre

(vi) Weight of medicine – Milligram

(vii) Weight of a pencil – Gram

14. The distance covered by a person from Bangalore to Delhi = 17,33,000 m

The distance covered by a person from Delhi to Los Angles = 1,28,74,000 m

Total distance covered by a person = 17,33,000 m + 1,28,74,000 m
$$= 14,607,000 \text{ m}$$
$$= \frac{14607000}{1000} \text{ km} = [1 \text{ km} = 1000 \text{ m}]$$
$$= 14,607 \text{ km}$$

15. A student multiplied 7236 by 65 instead of multiplying by 56

The difference between 65 and 56 is 9

Then we multiply 7236 by 9

$$\begin{array}{r} 7236 \\ \times 9 \\ \hline 65,124 \\ \hline \end{array}$$

This answer greater than the correct answer was 65,124.

16. Total lenght of the cloth = 14 m 80 cm
$$= 1480 \text{ cm}$$

No. of trousers = 8

length of cloth in each trouser = 1480 cm ÷ 8
$$= 185 \text{ cm}$$
$$= 1 \text{ m } 85 \text{ cm}$$

∴ 1 m 85 cm cloth will be required for each trouser

17. The distance between home and Saket's school = 500 m

The distance between Saket's school and his

father's office = 2 Km 200 m
$$= 2200 \text{ m.}$$

The total distance between his father's office from home
$$= 2200 \text{m} + 500 \text{m} = 2700 \text{ m}$$
$$= 2 \text{ km } 700 \text{ m.}$$

His father's office from home is 2 km 700 m.

EXERCISE-1.3

1. (a) 3654 + 4983

3654 is rounded off to	4,000
4983 is rounded off to	+ 5,000
∴ Estiamated sum	= 9,000

(b) 4804 + 3324

4804 is rounded off to	5,000
3324 is rounded off to	+ 3,000
∴ Estiamated sum	= 8,000

(c) 6346 + 7146

6346 is rounded off to	6,000
7146 is rounded off to	+ 7,000
∴ Estimated sum	= 13,000

(d) 3894 + 7794

3894 is rounded off to	4,000
7794 is rounded off to	+ 8,000
∴ Estiamated sum	= 12,000

(e) 863 − 454

863 is rounded off to	1000
454 is rounded of to	− 500
∴ Estiamated difference	= 500

(f) 8894 − 8168

8894 is rounded off to	9,000
8168 is rounded off to	− 8,000
∴ Estiamated difference	= 1,000

(g) 8006 − 4864

8006 is rounded off to	8,000
4864 is rounded off to	− 5,000
∴ Estiamated difference	= 3,000

(h) 6943 − 5157

6943 is rounded off to	7,000
5157 is rounded off to	− 5,000
∴ Estiamated difference	= 2,000

2. (a) 49 × 67

We round off. each value to nearest tens

49 rounded off as 50

67 rounded off as 70

∴ Estiamated product = 50 × 70 = 3,500

(b) 23 × 57

round off each value to nearest tens

23 rounded off as 20

57 rounded off as 60

∴ Estiamate product = 20 × 60 = 1,200

(c) 49 × 22

round off each value to nearest tens

49 rounded off as 50

22 rounded off as 20

∴ Estiamated product = 50 × 20 = 1,000

(d) 812 × 32

rounded off each value to nearest tens

812 rounded off as 810

32 rounded off as 30

∴ Estimated product = 810 × 30 = 24,300

3. (a) False

Estiamated sum of 4162 and 21319 rounded off to the nearest hundred is 25,500.

(b) False

When rounded off to nearest thousand, the no. 63,634 becomes 64,000

(c) True

4. 4056 is rounded off to 4000

53 is rounded off to 50

The estiamated no. of cartons of books in a warehouse = 4000

The estiamated no. of books in each carton = 50

The estimated of the total no. books is 4000 × 50 = 2,00,000

∴ 2,00,000 is the better estimate of the total no. of books.

EXERCISE-1.4

1. (a) 3 × (10 + 8)

= 3 × 10 + 3 × 8   OR = 3 × (18)

= 30 + 24   = 54

= 54

(b) 16 + (44 – 22)

= 16 + 20

= 38

(c) 18 × (20 – 8)

= 18 × 20 – 18 × 8

= 360 – 144

= 216

(d) 60 + (105 + 223)

= 60 + 328

= 388

(e) 254 – (305 – 136)

= 254 – 169

= 85

(f) 700 × (20 + 820)

= 700 × 840   OR = (700 × 20) + 700 × 820

= 5,88,000   = 14,000 + 5,74,000

= 5,88,000

2. (a) 16 = 10 + 6 = XVI   (b) 12 = 10 + 2 = XII
   (c) 42 = 40 + 2 = XLII   (d) 29 = 20 + 9 = XXIX
   (e) 96 = 90 + 6 = XCVI   (f) 97 = 90 + 7 = XCVII
   (g) 100 = C   (h) 163 = 100 + 60 + 3 = CLXIII
   (i) 492 = 400 + 90 + 2 = CDXCII   (j) 365 = 300 + 60 + 5 = CCCLXV
   (k) 800 = DCCC   (l) 1100 = 1000 + 100 = MC

3. (a) XXIII = 10 + 10 + 3 = 23   (b) XXXI = 10 + 10 + 10 + 1 = 31
   (c) XL = 50 – 10 = 40   (d) XLIV = (50 – 10) + (5 – 1) = 40 + 4 = 44
   (e) LIV = 50 + 4 = 54   (f) LXIII = 50 + 10 + 3 = 63
   (g) LXXVI = 50 + 10 + 10 + 6 = 76   (h) LXXXI = 50 + 10 + 10 + 10 + 1 = 81

6

(i) LXXXV = 50 + 10 + 10 + 10 + 5 = 85
(j) XC = (100 – 10) = 90
(k) XCIV = (100 – 10) + 4 = 94
(l) DCC = 500 + 100 + 100 = 700

4. (a) 1869 = 1000 + 800 + 60 + 9 = MDCCCLXIX
(b) 1947 = 1000 + 900 + 40 + 7 = MCMXLVII
(c) MCDXVIII = 1000 + 400 + 10 + 8 = 1418
Predecessor of 1418 = 1418 – 1 = 1417
(d) D = 500
Ist succeeding the Roman no. D = 500 + 1 = 501 = DI
IInd no.   501 + 1 = 502 = DII
IIIrd no.   502 + 1 = 503 = DIII

NCERT CORNER

EXERCISE-1.1

1. (a)   1 lakh = <u>10</u> ten thousand.
(b)   1 million = <u>10</u> hundred thousand
(c)   1 crore = <u>10</u> ten lakh
(d)   1 crore = <u>10</u> million
(e)   1 million = <u>10</u> lakh

2. (a) 73, 75, 307   (b) 9, 05, 000, 041
(c) 7, 52, 21, 302   (d) 58, 423, 202
(e) 23, 30, 010

3. (a) 8,75,95,762 = Eight crore seventy-five lakh ninety-five thousand seven hundred sixty two.
(b)   85,46,283 = Eighty-five lakh forty-six thousand two hundred eighty-three.
(c) 9,99,00,046 = Nine crore ninety-nine lakh forty-six.
(d) 9,84,32,701 = Nine crore eighty-four lakh thirty-two thousand seven hundred one.

4. (a)   78,92,1092 = Seventy-eight million nine hundred twenty-one thousand ninety-two.
(b)   7,452,283 = Seven million four hundred fifty two thousand two hundred two hundred eighty-three
(c)   99,985,102 = Ninety-nine million nine hundred eighty-five thousand one hundred two.
(d)   48,049,831 = Forty-eight million forty-nine thousand eight hundred thirty-one.

EXERCISE-1.2

1. No. of tickets sold on Ist day   =   1094
No. of tickets sold on IInd day   =   1812
No. of tickets sold on IIIrd day   =   2050
No. of tickets sold on IVth day   =   + 2751
                 ——————
Total tickets sold   =   7,707
                 ——————

∴ 7,707 tickets were sold on all the four days.

2. Runs to achieve = 10,000
   Runs scored = − 6,980
   _____
   Runs required = 3,020

   ∴ he needs 3,020 more runs.

3. Number of votes secured by successful candidates = 5,77,500
   No. of votes secured by his nearest rival = 3,48,700
   Margin between them = 5,77,500 − 3,48,700 = 2,28,800

   ∴ the successful candidate won by a margin of 2,28,800 votes.

4. Books sold in first week = 2,85,891
   Books sold in second week = + 4,00,768
   _____
   Total books sold = 6,86,659

   Since, 4,00,786 > 2,85,891
   ∴ sale of second week is greater than that of first week.
   Books sold in IInd week = 4,00,768
   Books sold in Ist week = − 2,85,891
   _____
   More books sold in IInd week = 1,14,877

   ∴ 1,14,877 more books were sold in second week.

5. Greatest 5-digit no. using 6,2,7,4,3 = 76432
   Smallest 5-digit no. using 6,2,7,4,3 = − 23467
   _____
   Difference = 52,965

   ∴ the difference is 52,965.

6. No. of screws manufactured in one day = 2,825
   No. of days in the month of Jan. (31 days) = 2825 × 31 = 87,575
   ∴ the machine produced 87,575 screws in the month of Jan.

7. Cost of one radio = ₹ 1200
   Cost of 40 radios = 1200 × 40 = ₹ 48,000
   Now, Total money with merchant = ₹ 78,592
   Money spent by her = − ₹ 48,000
   _____
   = ₹ 30,592

   ∴ ₹ 30,592 will remain with her after the purchase.

8. Wrong answer = 7236 × 65

$$
\begin{array}{r}
7236 \\
\times 65 \\
\hline
36180 \\
43416 \times \\
\hline
470340 \\
\end{array}
$$

Correct answer = 7236 × 56

$$
\begin{array}{r}
7236 \\
\times 56 \\
\hline
43416 \\
36180\times \\
\hline
405216 \\
\hline
\end{array}
$$

Difference in answer = 4,70,340 − 4,05,216 = 65,124

9. Cloth required to stitch one shirt = 2 m 15 cm = 215 cm
Length of cloth = 40 m = 4000 cm
No. of shirts can be stiteched = 4000 ÷ 215

$$
\begin{array}{r}
215\overline{)\,4000\,}(18 \\
-215 \\
\hline
1850 \\
-1720 \\
\hline
130
\end{array}
$$

∴ 18 shirts can be stitched and 130 cm (1 m 30 cm) cloth will remain.

10. The weight of one box = 4 kg 500 g = 4500 g
Max. load can be loaded in van = 800 kg = 8,00,000 g
No. of boxes = 8,00,000 ÷ 4500

$$
\begin{array}{r}
4500\overline{)800000}(177 \\
-4500 \\
\hline
35000 \\
-31500 \\
\hline
35000 \\
-31500 \\
\hline
3500
\end{array}
$$

∴ 177 boxes can be loaded.

11. Distance between school and home   =   1875 km
Distance between home and school   =   + 1875 km

Total distance covered in one day   =   3,750 km

Distance covered in six days = 3750 × 6 = 22500 km
∴ 22 km 500 m distance covered in six days.

12. Capacity of curd in a vessel = 4 l 500 ml = 4500 ml
Capacity of one glass = 25 ml
No. of glasses can be filled = 4500 ÷ 25

$$
\begin{array}{r}
25\overline{)\,4500\,}(180 \\
-25 \\
\hline
200 \\
-200 \\
\hline
\times
\end{array}
$$

∴ 180 glasses can be filled by curd.

EXERCISE-1.3

1. (a) 730 round off to   700
     998 round off to   + 1000

     Estimated sum =   1700

(b) 796 round off to   800
     314 round off to   − 300

     Estimated difference =   500

(c) 12904 round off to   13000
     2888 round off to   + 3000

     Estimated sum =   16000

(d) 28292 round off to   28000
     21496 round off to − 21000

     Estimated difference =   7000

2. (a) 439 round off to   400
     334 round off to   300
     4317 round off to   + 4300

     Estimated sum =   5000

(b) 1,08,734 round off to 108700
     47,599 round off to − 47600
     Estimated difference = 61100

(c) 8325 round off to   8300
     491 round off to   − 500

     Estimated difference = 7800

(d) 489348 round off to 489300
     48365 round off to − 48400

     Estimated difference = 440900

3. (a) 578 × 161
     578 round off to 600
     161 round off to 200
     Estimated product = 600 × 200 = 1,20,000

(b) 5281 round off to 5000
     3491 round off to 3500
     Estimated product = 5000 × 3500 = 1,75,00,000

(c) 1291 round off to 1300
     592 round off to   600
     Estimated product = 1300 × 600 = 7,80,000

(d) 9250 × 29
     9250 round off to 10,000
     29 round off to   30
     Estimated product = 10,000 × 30 = 3,00,000

SUBJECT ENRICHMENT EXERCISE

I.

1. (b) ten lakh

2. (c) hundred million

3. (b) 1

4. (d) 1002

5. (a) 2,00,000

6. (c) 75,800

7. (c) 69

8. (b) 3333

9. (b) 3

10. (d) all of these

II. (a) 8999

(b) (i) 1 billion = 1000 million

(ii) 1 million = 1000 thousand

(c) Place value of 6 in 42638 = 600
Face value of 6 in 42638 = 6
Difference between = 600 – 6 = 594
(d) the no. has been repeated. (addition)
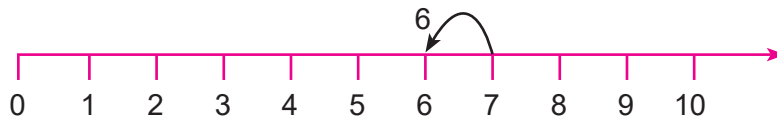(e) D and M
(f) Numerals
(g) Numeral system
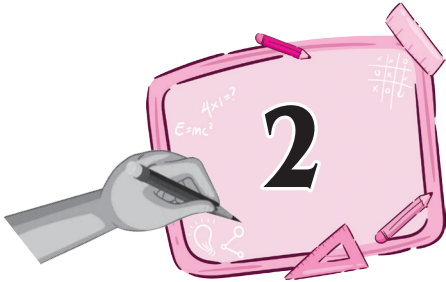
2 Whole Numbers

EXERCISE-2.1

1. (a) 347
Successor of 347 is 348
(b) 5,91,001
Successor of 5,91,001 is 5,91,002
(c) 4200
Successor of 4200 is 4201
(d) 771
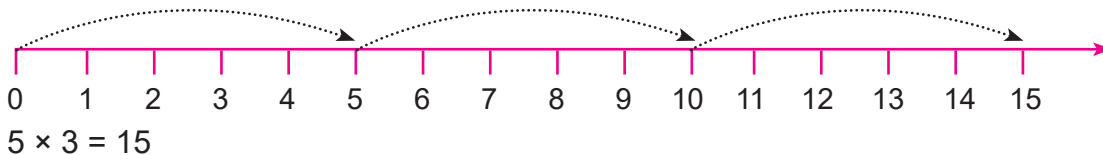Successor of 771 is 772

2. (a) Successor of 8
Successor of 8 is 9.

(b) Predecessor of 7
Predecessor of 7 is 6

3. There are (89 – 56) – 1 = 33 – 1 = 32 whole number between 56 and 89.

4. 10 – 6

5. 5 × 3

5 × 3 = 15

6. (a) The smallest whole number which is also a natural number is 1
   (b) The whole no. which is not a natural number is 0.
7. (a) The predecessor of the smallest 5-digit whole no. = 10,000 – 1 = 9,999
   (b) The predecessor of the greatest 4-digit natural no. = 9,999 – 1 = 9,998
8. (a) The successor of the smallest 3-digit number is = 100 + 1 = 101
   (b) The successor of the greates 6-digit no. is 9,99,999 + 1 = 10,00,000
9. (a) 1   (b) left
   (c) add   (d) Predecessor
   (e) 2
10. (a) The presecessor of 39 = 38   (b) The predecessor of 2010 = 2009
    (c) The predecessor of 3468 = 3467   (d) The predecessor of 100021 = 100020
    (e) The predecessor of 105000 = 104999   (f) The predecessor of 201000 = 200999
    (g) The predecessor of 167894 = 167893
11. (a) False   (b) True
    (c) True   (d) True
    (e) False   (f) False
12. The snallest 3-digit no. = 100
    The largest 2-digit no. = 99
    The relation between these two no's is they are consecutive numbers.

EXERCISE-2.2

1. (a) 72 + 64 = 64 + 72   (True)
   (b) 120 × 8 = 7 × 125   (False)
   (c) 678 × 1 = 1 × 678   (True)
   (d) 200 × 5 = 5 × 200   (True)
2. (a) 7 × 1 = 7   (b) 881 + 0 = 881
   (c) 181 + 0 = 181   (d) 7 × 8 = 8 × 7
   (e) 3 × 0 = 0   (f) 100 × 20 = 20 × 100
   (g) 5 × 87 × 20 = 100 × 87   (h) 273 + 34 + 46 = 80 + 273
3. Dhoni scores runs in Ist innings   = 25 runs
   Dhoni scores runs in IInd innings = 72 runs
   Virats scores runs in Ist innings   = 72 runs
   Virats scores runs in IInd innings = 25 runs
   A. T. Q.
   (25 + 72) = 72 + 25
   97 = 97
   ∴ Both scores equal runs in a match.
4. Maya cycling = 20 days
   She rides a cycle each day = 25 km
   She coverd a total distance in 20 days , 20 × 25 = 500 km

Jaya cycling = 25 days
She rides a cycle each day = 20 km
She covered a total distance in 25 days = 25 × 20 = 500 km
Both cycles a farther distance

5. Aditi sold boxes of balls = 5 days
Each box contains balls = 10 balls
Aditi sold total balls = 10 × 5 = 50 balls
Hari sold boxes of balls = 10 boxes
Each box contains balls = 5 balls
Hari sold total balls = 5 × 10 = 50 balls
Both sold same no. of balls.

6.

Properties	Addition	Subtraction	Multiplication	Division
(a) Colsure	✓	✗	✓	✗
(b) Commutative	✓	✗	✓	✗
(c) Associative	✓	✗	✓	✗
(d) Additive identity	✓	✗	✓	✗
(e) Multiplicative identity	✗	✗	✓	✗

7. (a) 20 + 48 = 48 + 20   [Commutative property of Addition]
 (b) 3 × 63 = 63 × 3   [Commutative property of Multiplication]
 (c) (67 + 42) + 40 = 67 + (42 + 40)   [Associative under Addition]
 (d) 49 + 88 + 51 = 88 + 100   [Associative under Addition]
 (e) (733 × 5) × 3 = 733 × (5 × 3)   [Associative under Multiplication]
 (f) 4 × 725 × 5 = 725 × (20)   [Associative under Multiplication]

8. (a) 5678 × 79 + 21 × 5678
 ⇒   = 5678 × 79 + 21 × 5678
     = 5678 × [79 + 21]   [distributive property of multiplication over addition]
     = 5678 × 100
     = 567800
 (b) 4654 × 167 − 52 × 4654 − 4654 × 15
 ⇒   4654 × 167 − 4654 × 52 − 4654 × 15
     = 4654 × (167 − 52 − 15)
     = 4654 × (167 − 67)
     = 4654 × 100
     = 465400

EXERCISE-2.3

1. (a)
1 × 9 + 1	=	10
12 × 9 + 2	=	110
123 × 9 + 3	=	1110
1234 × 9 + 4	=	11110
12345 × 9 + 5	=	111110
123456 × 9 + 6	=	1111110

(b) $3 \times 3 - 2 \times 2 = 9 - 4 = 5 = 3 + 2$

$4 \times 4 - 3 \times 3 = 16 - 9 = 7 = 4 + 3$

$5 \times 5 - 4 \times 4 = 25 - 16 = 9 = 5 + 4$

$19 \times 19 - 18 \times 18 = \underline{361} - \underline{324} = \underline{37} = 19 + 18$

$25 \times 25 - 24 \times 24 = 625 - \underline{567} = \underline{49} = \underline{25} + \underline{24}$

$101 \times 101 - 100 \times 100 = \underline{10201} - \underline{10000} = \underline{201} = \underline{101} + \underline{100}$

2. Yes, we can say one or both of them will be zero.

Example:- $5 \times 0 = 0$

$0 \times 0 = 0$

$0 \times 4 = 0$

3. (a) 16 as a rectangular pattern

• • • • • • • •
• • • • • • • •

(b) 25 as a square pattern

• • • • •
• • • • •
• • • • •
• • • • •
• • • • •

(c) 28 as a rectangular pattern

• • • • • • •
• • • • • • •
• • • • • • •
• • • • • • •

(d) 32 as the rectangular patterns

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II. • • • •
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4. (a) 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 +19 + 21 + 23 + 25 + 27 + 29 + 31 + 33 + 35 + 37
+ 39 = 20 × 20 = 400 **Ans.**

(b) 21 + 23 + 25 + 27 + 29 + 31 + 33 + 35 + 37 + 39 + 41 + 43 + 45 + 47 + 49
= (1 + 3 + 5 + 7 + ... + 49) − (1 + 3 + 5 + 7 + ... + 19)
= 25 × 25 − 10 × 10
= 625 − 100 = 525 **Ans.**

5. (a) 448 + 999
= 448 + (100 − 1)
= (448 + 100) − 1
= 548 − 1
= 547

(b) 7415 + 9999
= 7415 + (10000 − 1)
= (7415 + 10000) − 1
= 17415 − 1
= 17414

(c) 1568 + 99999
= 1568 + (100000 − 1)
= 101568 − 1
= 101567

(d) 1700 − 99
= 1700 − (100 − 1)
= (1700 − 100) + 1
= 1600 + 1 = 1601

(e) 58247 − 9999
= 58257 − (10000) + 1
= 48247 + 1
= 48248

(f) 21568 − 9999
= 21568 − 10000 + 1
= 11568 + 1
= 11569

6. (a) 628 × 101
= 628 × (100 + 1)
= (628 × 100) + (628 × 1)
= 62800 + 628
= 63428

(b) 784 × 25
= 784 × (20 +5)
= 784 × 20 + 784 × 5
= 15680 + 3920
= 19600

(c) 543 × 125
= 543 × (100 + 20 + 5)
= (543 × 100) + (543 × 10) + (543 × 5)
= 54300 + 10860 + 2715
= 67875

(d) 5634 × 1001
= 5634 × (1000 + 1)
= (5634 × 1000) + (5634 × 1)
= 5634000 + 5634
= 5639634

(e) 108 × 35
= (100 + 8) × 35
= 100 × 35 + 8 × 35
= 3500 + 280
= 3780

(f) 748 × 75
= 748 × (70 +5)
= 748 × 70 + 748 × 5
= 52360 + 3740
= 56100

7. 0 and 1 are the whole number which when multiplied with itself gives the same number.

8. (a) 8th square number
A square no. can easily be remembered by the following rule.
N^{th} square no. = n × n
8th square no. 8 × 8 = 64

(b) 6th square no.
A square no. can easily be remembered by the following rule.
N^{th} square no. = n × n
8th square no. = 6 × 6 = 36

(NCERT CORNER)

EXERCISE-2.1

1. The next three natural numbers after 10,999 are 10999 + 1, 10999 + 2 and 10999 + 3 i.e., 11000, 11001, 11002.

2. The three whole number occurring just before 10,001 are 10,000, 9999 and 9998.

3. 0 is the smallest whole no.

4. There are (53 – 32) – 1 = 21 – 1 = 20 whole no's between 32 and 53

5. (a) 2440701 + 1 = 2440702
   (b) 100199 + 1 = 100200
   (c) 1099999 + 1 = 1100000
   (d) 2345670 + 1 = 2345671

6. (a) 94 – 1 = 93
   (b) 1000 –1 = 9999
   (c) 208090 – 1 = 208089
   (d) 7654321 – 1 = 7654320

7. (a) 530, 503
   Here, 503 lies on the left of 530 on the number line.
   ∴ 530 > 503
   (b) 370, 307
   Here, 307 lies on the left of 370 on the number line.
   ∴ 370 > 307
   (c) 98765, 56789
   Here, 56789 lies on the left of 98765 on the number line.
   ∴ 98765 > 56789
   (d) 9830415, 10023001
   Here, 9830415 lies on the left of 10023001 on the number line.
   ∴ 9830415 < 10023001

8. (a) False   (b) False   (c) True   (d) True   (e) True
   (f) False   (g) False   (h) False   (i) True   (j) False
   (k) False   (l) True   (m) False

EXERCISE-2.2

1. (a) 837 + 208 + 363
   = (837 + 363) + 208
   = 1200 + 208 = 1408

   (b) 1962 + 453 + 1538 + 647
   = (1962 + 1538) + (453 + 647)
   = 3500 + 1100
   = 4600

2. (a) 2 × 1768 × 50
   = (2 × 50) × 1768
   = 100 × 1768
   = 176800

   (b) 4 × 166 × 25
   = (4 × 25) × 166
   = 100 × 166
   = 16600

(c) 8 × 291 × 125
= (85 × 125) × 291
= 1000 × 291
= 291000

(e) 285 × 5 × 60
= 285 × (5 × 60)
= 285 × 300
= 85500

3. (a) 297 × 17 + 297 × 3
= 297 × (17 + 3)
= 297 × 20
= 5940

(c) 81265 × 169 – 81265 × 69
= 81265 × (169 – 69)
= 81265 × 100
= 8126500

4. (a) 738 × 103
= 738 × (100 + 3)
= 738 × 100 + 738 × 3
= 73800 + 2214
= 76014

(c) 258 × 1008
= 258 × (1000 + 8)
= 258 × 1000 + 258 × 8
= 258000 + 2064
= 260064

(d) 625 × 279 × 16
= (625 × 16) × 279
= 10000 × 279
= 2790000

(f) 125 × 40 × 8 × 25
= (125 × 8) × (40 × 25)
= 1000 × 1000
= 1000000

(b) 54279 × 92 + 8 × 54279
= 54279 × (92 + 8)
= 54279 × 100
= 5427900

(d) 3845 × 5 × 782 + 769 × 25 × 218
= 3845 × 5 × 782 + 769 × 5 × 5 × 218
= (3845 × 5) × 782 + (3845 × 5) × 218
= (3845 × 5) × (782 + 218)
= 19225 × 1000
= 19225000

(b) 854 × 102
= 854 × (100 + 2)
= 854 × 100 + 854 × 2
= 85400 + 1708
= 87108

(d) 1005 × 168
= (1000 + 5) × 168
= 1000 × 168 + 5 × 168
= 168000 + 840
= 168840

5. Petrol filled on Monday and Tuesday = 40 l + 50 l = 90 l
Cost of petrol @ ₹ 44 per litre = 90 × 44 = ₹ 3960
∴ he spent ₹ 3960 on petrol

6. Milk supplied to a hotel in the morning and evening = 32 l + 68 l = 100 l.
Money due to the vendor per day = 100 × ₹ 45 = 4500
∴ ₹ 4500 is due to the vendor per day.

7. (i) Distributivity of multiplication over addition.
 (ii) Commutivity under multiplication
(iii) Commutivity under addition.

EXERCISE-2.3

1. (a) $1 + 0 = 1 \neq 0$

(c) $\dfrac{0}{2} = 0$

(b) $0 \times 0 = 0$

(d) $\dfrac{10 - 10}{2} = \dfrac{0}{2} = 0$

Thus, only (a) does not represent zero

2. Yes, if we multiply any no. with zero the resultant product will be zero.

   Example: $2 \times 0 = 0$, $0 \times 0 = 0$

   $0 \times 5 = 0$

   If both no. are zero, then the result also be zero.

3. If only one no. be 1 then the product cannot be 1

   Example: $5 \times 1 = 5$, $4 \times 1 = 4$, $1 \times 8 = 8$

   If both no. are 1 then the product is $1 \times 1 = 1$

4. (a) 728×101

   $= 728 \times (100 + 1)$

   $= 728 \times 100 + 728 \times 1$

   $= 72800 + 728$

   $= 73528$

   (b) 5437×1001

   $= 5437 \times (1000 + 1)$

   $= 5437 \times 1000 + 5437 \times 1$

   $= 5437000 + 5437$

   $= 5442437$

   (c) 824×25

   $= 824 \times (20 + 5)$

   $= (824 \times 20) + (824 \times 5)$

   $= 16480 + 4120$

   $= 20600$

   (d) 4275×125

   $= 4275 \times (100 + 20 + 5)$

   $= (4275 \times 100) + (4275 \times 20) + (4275 \times 5)$

   $= 427500 + 85500 + 21375$

   $= 534375$

   (e) 504×35

   $= (500 + 4) \times 35$

   $= (500 \times 35) + 4 \times 35$

   $= 17500 + 140$

   $= 17640$

5. (a) $123456 \times 8 + 6 = 987654$

   $1234567 \times 8 + 7 = 9876543$

   Pattern works like this

   $1 \times 8 + 1 = 9$

   $(11 + 1) \times 8 + 2 = 12 \times 8 + 2 = 98$

   $(111 + 11 + 1) \times 8 + 3 = 123 \times 8 + 3 = 987$

   $(1111 + 111 + 11 + 1) \times 8 + 4 = 1234 \times 8 + 4 = 9876$

   $(11111 + 1111 + 111 + 11 + 1) \times 8 + 5 = 12345 \times 8 + 5 = 98765$

   $(111111 + 11111 + 1111 + 111 + 11 + 1) \times 8 + 6 = 123456 \times 8 + 6 = 987654$

   $(1111111 + 111111 + 11111 + 1111 + 111 + 11 + 1) \times 8 + 7 = 1234567 \times 8 + 7 = 9876543$

SUBJECT ENRICHMENT EXERCISE

I. (1) 0

   (2) 9988

   (3) 0

   (4) their difference

   (5) 0

II. (a) right side

   (b) whole no.

   (c) Subtraction and division

   (d) addition, Multiplication

   (e) Zero (0)

   (f) 1 (one)

   (g) Associative

   (h) Zero

3 Playing with Numbers

1. (a) 12

12 = 1 × 12

2 × 6

3 × 4

So, the factors of 12 are : 1, 2, 3, 4, 6 and 12.

(b) 25

25 = 1 × 25

5 × 5

So, the factors of are: 1, 5 and 25

(c) 36

36 = 1 × 36

2 × 18

3 × 12

4 × 9

6 × 6

So, the factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18 and 36.

(d) 24

24 = 1 × 24

2 × 12

3 × 8

4 × 6

So, the factors of 24 are 1, 2, 3, 4,6, 8, 12, and 24.

(e) 18

18 = 1 × 18

2 × 9

3 × 6

So, the factorised of are 1, 2, 3, 6, 9 and 18

(f) 36

36 = 1 × 36

2 × 18

3 × 12

4 × 9

6 × 6

So, the factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18 and 36.

(g) 108

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

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

(h) 250

$250 = 1 \times 250$
$ 2 \times 125$
$ 5 \times 50$
$ 10 \times 25$

So, the factors of 250 are 1, 2, 5, 10, 25, 125 and 250.

2. (a) 55 the multiples of 55 lies between 200 and 300 are 220 and 275

$55 \times 4 = 220$
$55 \times 5 = 275$
$55 \times 6 = 330$

(b) 63

The multiples of 63 = 63, 126, 189, 252, 315 ...

The required multiples of 63 lies between 200 and 300 is 252.

(c) 82

The multiples of 82

$82 \times 1 = 82$
$82 \times 2 = 162$
$82 \times 3 = 246$
$82 \times 4 = 328$ and so on.

∴ The multiples of 82 lies between 200 and 300 is 246

(d) 91

The multiples of 91

$91 \times 1 = 91$
$91 \times 2 = 182$
$91 \times 3 = 273$
$91 \times 4 = 364$ and so on.

∴ The multiples of 91 lies between 200 and 300 is 273

(e) 43

The multiples of 43 = 43, 86, 129, 172, 215, 258, 301, ...

∴ The required multiples of 43 lies between 200 and 300 are 215 and 258

(f) 25

The multiples of 25 are 25, 50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300, 325, ...

∴ The required multiples of 25 lies between 200 and 300 are 225, 250, 275.

(g) 50

The multiple of 50 = 50, 100, 150, 200, 250, 300, 350, ...

∴ The required multiples of 50 lies between 200 and 300 are 250

(h) 60

The multiples of 60 = 60, 120, 180, 240, 300, 360,...

So, the required multiples of 60 lies between 200 and 300 is 240.

3. (a) 72

Yes, 72 is property divided by 2, then 72 is a multiple of 2.

(b) 83

No, 83 is not multiple of 2 because it is not properly divided by 2.

(c) 896

Yes, 896 is a multiple of 2 because it is properly divided by 2.

(d) 5645

No, 5645 is not a multiple of 2 because it is not exactly divided by 2.

4. (a) 670

Yes, 670 is a multiple of 10 because it is exactly divided by 10

(b) 7436

No, 7436 is not a multiple of 10 because it is not exactly divided by 10.

(c) 1908

No, 1908 is not a multiple of 10 because it is not exactly divided by 10.

(d) 843900

Yes, 843900 is a multiple of 10 because it is exactly divided by 10.

5. (a) 10

The multiples of 10 between 55 and 105 are 50, 60, 70, 80, 90, 100

(b) 15

The multiples of 15 between 55 and 105 are 60, 75, 90

(c) 20

The multiples of 20 between 55 and 105 are 60, 80 and 100

(d) 25

The multiples of 25 between 55 and 105 are 75 and 100.

6. (a) 5

∴ The first five multiples of 5 are 5, 10, 15, 20, 25.

(b) 8

∴ The first five multiples of 8 are 8, 16, 24, 32 and 40.

(c) 9

∴ The first five multiples of 9 are 9, 18, 27, 36 and 45.

7. (a) Multiple

(b) 1

(c) Multiples, factors

(d) The first

EXERCISE-3.2

1. (a) Number 1 is neither prime nor composite.

(b) There are 4 prime no. between 1 and 10. These number are 2, 3, 5 and 7

(c) The 4 prime 40 no. between 10 and 20 are 11, 13, 17 and 19.

(d) The only even number which is prime is 2.

(e) Because other even no (except 2) have more than two factors. So, all even no's other than 2 are composite numbers.

(f) Prime number between 1 and 100 having unit place digit 3 is 7. No even number can be a prime number.

(g) The twin primes between 1 and 100 are (3, 5), (5, 7), (11, 13), (17, 19), (29, 31), (41, 43), (59, 61), (71, 73).

2. (a) 141 = No prime Number

(b) 181 = Yes Prime Number

(c) 86 = No Prime Number

(d) 87 = No Prime Number

(e) 81 = No Prime Number

(f) 67 = Yes Prime Number

(g) 89 = Yes Prime Number

(h) 61 = Yes Prime Number

(i) 41 = Yes Prime Number

(j) 97 = Yes Prime Number

(k) 91 = No prime Number

(l) 30 = No Prime Number

(m) 163 = Yes Prime Number

(n) 136 = No Prime Number

3. (a) 52 and 81

factors of 52 = ①, 2, 4, 13, 26, 52

factors of 81 = ①, 3, 9, 27, 81

The common factor of 52 and 81 = 1

∴ 52 and 81 are co-prime numbers

(b) 294 and 256

factors of 294 = ①, ②, 3, 6, 7, 14, 21, 42, 49, 98, 147, and 294

factors of 256 = ①, ②, 4, 8, 32, 64, 128, 256

The common factors of 294 and 256 = 1 and 2

∴ No, 294 and 256 are not co-prime numbers

(c) 88 and 187

factors of 88 = ①, 2, 4, 8, ⑪, 22, 44, and 88

factors of 187 = ①, ⑪, 17, 187

The common factors of 88 and 187 = 11 and 1

∴ No, 88 and 187 are not co-prime number

(d) 675 and 392

factors of 675 = ①, 3, 5, 9, 15, 25, 27, 45, 75, 135, 225, and 675

factors of 392 = ①, 2, 4, 7, 8, 14, 28, 49, 56, 98, 196, 392

The common facotrs of 675 and 392 = 1

∴ 675 and 392 are co-prime number

4. Prime — 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

Composite — 4, 6, 8, 9, 10,12, 14, 15, 16, 18, 20, 21, 22, 24, 25, 26, 27, 28.

5. (a) 3

(b) 4

(c) 19

(d) two

(e) Prime Number

(f) 25

(g) 9

6. (a) No (False)

(b) False

(c) False

(d) False

7. (a) Twin Prime Number

(b) 97

(c) Only 2 number is even Prime Number

(d) 3 and 2. Their sum is 5 which is also a prime number.

2 and 11. Their sum is 13 which is a prime number

8. (a) 44 = 13 + 31   or   3 + 41

(b) 36 = 5 + 31   or   7 + 29

(c) 24 = 11 + 13   or   7 + 17

(d) 18 = 7 + 11   or   11 + 7

EXERCISE-3.3

1.

	2	3	4	5	6	7	8	9	10	11
(a) 248	yes	No	Yes	No	No	No	Yes	No	No	No
(b) 996	Yes	Yes	Yes	No	Yes	No	No	No	No	No
(c) 1998	Yes	Yes	No	No	Yes	No	No	Yes	No	No
(d) 2051	No	No	No	No	No	Yes	No	No	No	No
(e) 429714	Yes	Yes	No	No	Yes	No	No	Yes	No	No
(f) 406839	No	Yes	No	No	No	No	No	No	No	No
(g) 92444	Yes	No	Yes	No	No	No	No	No	No	Yes
(h) 2755	No	No	No	No	No	No	No	No	No	No

2. We know that a no. is divisible by 9, if the sum of its digits is divisible by 9.

(a) 234

In 234; The sum of its digit is 2 + 3 + 4 = 9, which is divisible by 9

∴ 234 is divisible by 9.

(b) 1029

In 1029, sum of its digit = 1 + 0 + 2 + 9 = 12, which is not divisible by 9.

∴ 1029 is not divisible by 9.

(c) 3717

In 3717, sum of its digits = 3 + 7 + 1 + 7 = 18, which is divisible by 9

∴ 3717 is divisible by 9

(d) 7965

In 7965, sum of its digits = 7 + 9 + 6 + 5 = 27, which is divisible by 9

∴ 7965 is divisible by 9.

3. We know that a no. is divisible by 10, if the digit at ones place of the number is 0.

(a) 5678

In 5678, its one place is 8, which is not divisible by 10.

∴ 5678 is not divisible by 10.

(b) 54090

In 54090, its one place is 0. So, it is divisible by 10.

(c) 678500

In 678500, its one place is 0. So, it is divisible by 10.

(d) 6200

In 6200, its one place is 0. so, it is divisible by 10.

(e) 9850

In 9850, its one place is 0. So, it is divisible by 10.

4. (a) 10 is divisible by 2 but not by 4.

(b) 9 is divisible by 3 but not by 6.

(c) 12 is divisible by 4 but not by 8.

(d) 24 is divisible by both 4 and 8 but not by 32.

5. We know that a no. is divisible by 9, if the sum of its digit is divisible by 9.

(a) 66784*

For 66784*, we have 6 + 6 + 7 + 8 + 4 = 31, we add 5 to 31, the resulting no. 36 will be divisible by 9.

∴ The required digit is 5.

(b) 835*86

For 835*86, we have 8 + 3 + 5 + 8 + 6 = 30, we add 6 to 30, the resulting no. 36 will be divisible by 9.

∴ The required digit is 6.

(c) 211*58

For 211*58, we have 2 + 1 + 1 + 5 + 8 = 17, we add 1 to 17, the resulting no. 18 will be divisible by 9.

∴ The required digit is 1.

EXERCISE-3.4

1. (a) 36 and 45

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

factors of 45 are ①, ③, 5, ⑨, 15, and 45

Thus, common factors of 36 and 45 are 1, 3, 9.

(b) 75, 100 and 125

factors of 75 are ①, 3, ⑤, 15, ㉕ and 75

factors of 100 are ①, 2, 4, ⑤, 10, 20, ㉕, 50 and 100

factors of 125 are ①, ⑤, ㉕ and 125

Thus, common factors of 75, 100 and 125 are 1, 5 and 25

(c) 56 and 120

factors of 56 are ①, ②, ④, 7, ⑧, 14, 28 and 56

factors of 120 are ①, ②, 3, ④, 5, 6, ⑧, 10, 12, 15, 20, 24, 30, 40, 60, and 120

Thus, common factors of 56 and 120 are 1, 2, 4 and 8

2. (a) 3, 5 and 7

Multiples of 3 are 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 48, ...

Multiples of 5 are, 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, ...

Multiples of 7 are 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84, 91, 98, ...

∴ Common multiples of 3, 5 and 7 are 105, 210, 315, ...

(b) 8, 10 and 20

Multiples of 8 are 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, ...

Multiples of 10 are 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, ...

Multiples of 20 are 20, 40, 60, 80, 100, 120, 140, 160, 180, 200,....

∴ Common multiples of 8, 10, 20 are 40, 80, 120, ...

(c) 12, 24, 36

Multiples of 12 are 12, 24, 36, 48, 60, 72, 84, 96, 108, 120, ...

Multiples of 24 are 24, 48, 72, 96, 120, 144, 168, 192, 216, 240, 264, 288, 312, 336, 360,...

Multiples of 36 are 36, 72, 108, 144, 180, 216, 252, 288, 324, 360, 396, 432,....

∴ Common Multiples of 12, 24, and 36 are 72, 144, ...

3. (a) 21 and 61

factors of 21 are 1, 3, 7 and 21

factors of 61 are 1 and 61

common factor is 1

∴ The pair of 21 and 61 are Co-primes numbers.

(b) 26 and 65

factors of 26 are 1, 2, 13 and 26

factors of 65 are 1, 5, 13 and 65

Common factors are 1 and 13

∴ The pair of 26 and 65 are not Co-prime numbers

(c) 45 and 54

factors of 45 are 1, 3, 5, 9, 15 and 45

factors of 54 are 1, 2, 3, 6, 9, 18, 27 and 54

common factors are 1, 3, 9

∴ The pair of 45 and 54 are not Co-prime numbers

EXERCISE-3.5

1. (a) 252

$252 = 2 \times 2 \times 3 \times 3 \times 7$

(b) 688

$688 = 2 \times 2 \times 2 \times 2 \times 43$

(c) 945

$945 = 3 \times 3 \times 3 \times 7 \times 5$

(d) 732

$732 = 2 \times 2 \times 3 \times 61$

(e) 1260

$1260 = 2 \times 2 \times 3 \times 3 \times 5 \times 7$

(f) 4335

$4335 = 3 \times 5 \times 17 \times 17$

(g) 2907

$2907 = 3 \times 3 \times 17 \times 19$

(h) 2520

$2520 = 2 \times 2 \times 2 \times 3 \times 3 \times 5$

2. (a) $48 = 2 \times 2 \times 3 \times 4$ is not a prime factroziation as 4 is not a prime number

(b) $168 = 7 \times 2 \times 3 \times 2 \times 2$ is a prime factorization as 2, 3, and 7 are prime numbers

(c) $350 = 2 \times 25 \times 7$ is not a prime factorization as 25 is not a prime number

(d) $28 = 2 \times 14$ is not a prime factorization as 14 is not a prime number.

3. Smallest 4-digit number = 1000

Prime factorization of $1000 = 2 \times 2 \times 2 \times 5 \times 5 \times 5$

2	1000
2	500
2	250
2	125
5	25
5	5
	1

4. The smallest 5-digit number = 10,000

2	10000
2	5000
2	2500
2	1250
5	625
5	125
5	25
5	5
	1

Product of prime fators of 10,000 = 2 × 2 × 2 × 2 × 5 × 5 × 5 × 5

5. 1 and the composite number itself are not included in the prime factorisation of a composite number

EXERCISE-3.6

1. (a) 48, 64

By listing factors:-

factors of 48 = ①, ②, 3, ④, 6, ⑧, 12, ⑯, 24 and 48

factors of 64 = ①, ②, ④, ⑧, ⑯, 32 and 64

Common factors = 1, 2, 4, 8, 16

(b) 24, 72

factors of 24 = ①, ②, ③, ④, ⑥, ⑧, ⑫ and ㉔

factors of 72 = ①, ②, ③, ④, ⑥, ⑧, 9, ⑫, 18, ㉔, 36 and 72

Common factors = 1, 2, 3, 4, 6, 8, 12 and 24

(c) 39, 52

factors of 39 = ①, 3, ⑬ and 39

factors of 52 = ①, 2, 4, ⑬, 26 and 52

Common factors = 1 and 13

(d) 36, 60

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

factors of 60 = ①, ②, ③, 4, 5, ⑥, 10, ⑫, 15, 20, 30 and 60

Common factors = 1, 2, 3, 4, 6 and 12

(e) 345, 125
factors of 345 = (1), 3, (5), 15, 23, 69, 115, 345
factors of 125 = (1), (5), 25, 125
Common factors = 1 and 5

(f) 69, 253
factors of 69 = (1), 3, (23), and 69
factors of 253 = (1), 11, (23), 253
Common factors = 1 and 23

(g) 203, 551
factors of 203 = (1), 7, (29) and 203
factors of 551 = (1), 19, (29), 551
Common factors = 1 and 29

(h) 169, 337
factors of 169 = (1), 13, 169
factors of 337 = (1), 337
Common factors = 1

2. (a) 42, 56
factors of 42 = (1), (2), 3, 6, (7), (14) , 21, 42
factors of 56 = (1), (2), 4, (7), 8, (14), 28, 56
Common factors = 1, 2, 7 and 14
H. C. F. of 42 and 56 = (14)

(b) 24, 52
factors of 24 = (1), (2), 3, (4), 6, 8, 12 and 24
factors of 52 = (1), (2), (4), 13, 26, 52
Common factors = 1, 2, 4
H.C.F of 24, 52 = 4

(c) 39, 52
factors of 39 = (1), 3, (13) and 39
factors of 52 = (1), 2, 4, (13), 26 and 52
H.C.F of 39, 52 = 13

(d) 44, 77
factor of 44 = (1), 2, 4, (11), 22 and 44
factor of 77 = (1), 7, (11) and 77
H.C. F of 44 and 77 = 11

(e) 45, 60
factors of 45 = (1), (3), (5), 9, (15), 45
factors of 60 = (1), 2, (3), 4, (5), 6, 10, 12, (15), 20 30, 60
H.C.F of 45 and 60 = 15

(f) 36, 54
factors of 36 = (1), (2), (3), 4, (6), (9), 12, 18, 36
factors of 54 = (1), (2), (3), (6), (9), 18, 27, 54
H.C.F of 36 and 54 = 18

(g) 20, 50

factors of 20 = ①, ②, 4, ⑤, ⑩, and 20

factors of 50 = ①, ②, ⑤, ⑩, 25, 50

H.C.F of 20 and 50 = 10

(h) 16, 70

factors of 16 = ①, ②, 4, 8, 16

factors of 70 = ①, ②, 5, 7, 10, 14, 35, 70

H.C.F = 2

3. (a) 59, 97

59 = ①, 59

97 = ①, 97

Common factor = 1

∴ 59, 97 are Co-prime number

(b) 161, 192

factors of 161 = ①, 7, 23 and 61

factors of 192 = ①, 2, 3, 4, 6, 8, 12, 16, 24, 32, 48, 64, 96, 192

Common facotrs = 1

∴ 161 and 192 are Co-prime numbers

(c) 343, 432

factors of 343 = 1, 7, 49 and 343

factors of 432 = 1, 2, 3, 4, 6, 8, 9, 12, 16, 18, 24, 27, 36, 48, 54, 72, 108, 144, 216, 432

Common factors = 1

∴ 343 and 432 are Co-prime numbers

(d) 512, 945

factors of 512 = 1, 2, 4, 8, 16, 32, 64, 128, 256, 512

factors of 945 = 1, 3, 5, 7, 9, 15, 21, 27, 35, 45, 63, 105, 135, 189, 315, 945

Common factors = 1

∴ 512 and 945 are Co-prime number

(e) 385, 621

factors of 385 = 1, 5, 7, 11, 35, 55, 77, 385

factors of 621 = 1, 3, 9, 23, 27, 69, 207, 621

Common factor = 1

∴ 385 and 621 are Co-prime number

(f) 843, 1014

factors of 843 = 1, 3, 281, 843

factors of 1014 = 1, 2, 3, 6, 13, 26, 39, 78, 169, 338, 507, 1014

Common factors = 1 and 3

∴ 843 and 1014 are not Co-prime number

(g) 320, 480

factors of 320 = 1, 2, 4, 5, 8, 10, 16, 20, 32, 40, 64, 80, 160, 320

factors of 480 = 1, 2, 3, 4, 5, 6, 8, 10, 15, 16, 20, 24, 30, 32, 40, 48, 60,80, 96, 120, 160, 240, 480

Common factors = 1, 2, 4, 8 etc.

∴ 320, 480 are not Co-prime factors

(h) 169, 337

factors of 169 = 1, 13 and 169

factors of 337 = 1, 337

Common factors = 1

∴, 169 and 337 are Co-prime number

4. (a) 84, 98

2	84
2	42
3	21
7	7
	1

2	98
7	49
7	7
	1

Prime factorization of 84 = 2 × 2 × 3 × 7

Prime factorization of 98 = 2 × 7 × 7

H.C.F. = 2 × 7 = 14

(b) 170, 238

2	170
5	85
17	17
	1

2	238
7	119
17	17
	1

Prime factorization of 170 = 2 × 5 × 17

Prime factorization of 238 = 2 × 7 × 17

H.C.F. of 170, 238 = 2 × 17 = 34

(c) 504, 980

2	504
2	252
2	126
3	63
3	21
7	7
	1

2	980
2	490
5	245
7	49
7	7
	1

Prime factorization of 504 = 2 × 2 × 2 × 3 × 3 × 7

Prime factorization of 980 = 2 × 2 × 5 × 7 × 7

H.C.F = 2 × 2 × 7 = 28

(d) 72, 108, 180

2	72		2	108		2	180
2	36		2	54		2	90
2	18		3	27		3	45
3	9		3	9		3	15
3	3		3	3		5	5
	1			1			1

Prime factorization of 72 = 2 × 2 × 2 × 3 × 3

Prime factorization of 108 = 2 × 2 × 3 × 3 × 3

Prime factorization of 180 = 2 × 2 × 3 × 3 × 5

H.C.F = 2 × 2 × 3 × 3 = 36

5. (a) 390, 520

$$390 \overline{)520} \big(1$$
$$-390$$
$$130 \overline{)390} \big(3$$
$$-390$$
$$\times$$

H.C.F = last divisor = 130

(b) 1560, 2016

$$1560 \overline{)2016} \big(1$$
$$-1560$$
$$456 \overline{)1560} \big(3$$
$$-1368$$
$$192 \overline{)456} \big(2$$
$$-384$$
$$72$$
$$72 \overline{)192} \big(2$$
$$-144$$
$$48 \overline{)72} \big(1$$
$$-48$$
$$24 \overline{)48} \big(2$$
$$-48$$
$$\times$$

H.C.F = last divisor = 24

(c) 2628, 8541

$$2628 \overline{\smash{)}8541}(3$$
$$-7884$$

$$657 \overline{\smash{)}2628}(4$$
$$-2628$$
$$\times$$

H.C.F = 657

(d) 1197, 1311, 627

$$1197 \overline{\smash{)}1311}(1$$
$$-1197$$

$$114 \overline{\smash{)}1197}(10$$
$$-1140$$

$$57 \overline{\smash{)}114}(2$$
$$-114$$
$$\times$$

H.C.F. = 57

EXERCISE-3.7

1. (a) 12, 20

Prime factorization of 12 = 2 × 2 × 3
Prime factorization of 20 = 2 × 2 × 5
LCM = (2 × 2) × 3 × 5 = 60

(b) 20, 36

Prime factorization of 20 = 2 × 2 × 5
Prime factorization of 36 = 2 × 2 × 3 × 3
LCM = (2 × 2) × (3 × 3) × 5 = 180

(c) 45, 55

Prime factorization of 45 = 3 × 3 × 5
Prime factorization of 55 = 5 × 11
LCM = 3 × 3 × 5 × 11 = 495

(d) 60, 72

Prime factorization of 60 = 2 × 2 × 3 × 5
Prime factorization of 72 = 2 × 2 × 2 × 3 × 3
LCM = (2 × 2 × 2) × (3 × 3) × 5 = 360

(e) 27, 60, 72

Prime factorization of 27 = 3 × 3 × 3
Prime factorization of 60 = 2 × 2 × 3 × 5
Prime factorization of 72 = 2 × 2 × 2 × 3 ×3
LCM = 2 × 2 × 2 × 3 × 3 × 3 ×5 = 1080

(f) 36, 54, 63

Prime factorization of 36 = 2 × 2 × 3 × 3
Prime factorization of 54 = 2 × 3 × 3 ×3
Prime factorization of 63 = 3 × 3 × 7
LCM = (2 × 2) × (3 × 3 × 3) × 7 = 756

(g) 49, 63, 84

Prime factorization of 49 = 7 × 7
Prime factorization of 63 = 3 × 3 × 7
Prime factorization of 84 = 2 × 2 × 3 × 7
LCM = 2 × 2 × 3 × 3 × 7 × 7 = 1692

(h) 81, 126, 155, 252

Prime factorization of 81 = 3 × 3 × 3 × 3
Prime factorization of 126 = 2 × 3 × 3 × 7
Prime factorization of 155 = 5 × 31
Prime factorization of 252 = 2 × 2 × 3 × 3 × 7
LCM = (2 × 2)(3 × 3 × 3 × 3) × 5 × 7 × 31
= 351540

2. (a) 42, 63

```
2 | 42, 63
3 | 21, 63
3 | 7,  21
7 | 7,   7
  |    1
```

LCM = 2 × 3 × 3 × 7 = 126

(b) 60, 75

```
2 | 60, 75
2 | 30, 75
3 | 15, 75
5 | 5,  25
5 | 1,   5
  |    1
```

LCM = 2 × 2 × 3 × 5 × 5 = 300

(c) 12, 18, 20

```
2 | 12, 18, 20
2 | 6,  9,  10
3 | 3,  9,   5
3 | 1,  3,   5
5 | 1,  1,   5
  | 1,  1,   1
```

LCM = 2 × 2 × 3 × 3 × 5 = 180

(d) 9, 15, 18

```
2 | 9, 15, 18
3 | 9, 15,  9
3 | 3,  5,  3
5 | 1,  5,  1
  | 1,  1,  1
```

LCM = 2 × 3 × 3 × 5 = 90

(e) 36, 40, 126

```
2 | 36, 40, 126
2 | 18, 20,  63
2 | 9,  10,  63
3 | 9,   5,  63
3 | 3,   5,  21
5 | 1,   5,   7
7 | 1,   1,   7
  | 1,   1,   1
```

LCM = 2 × 2 × 2 × 3 × 3 × 5 × 7 = 2520

(f) 16, 28, 40, 77

```
2 | 16, 28, 40, 77
2 | 8,  14, 20, 77
2 | 4,   7, 10, 77
2 | 2,   7,  5, 77
5 | 1,   7,  5, 77
7 | 1,   7,  1, 77
11| 1,   1,  1, 11
  | 1,   1,  1,  1
```

LCM = 2 × 2 × 2 × 2 × 5 × 7 × 11 = 6160

(g) 28, 36, 45, 60

```
2 | 28, 36, 45, 60
2 | 14, 18, 45, 30
3 | 7,  9,  45, 15
3 | 7,  3,  15,  5
5 | 7,  1,   5,  5
7 | 7,  1,   1,  1
  | 1,  1,   1,  1
```

(h) 144, 180, 384

```
2 | 144, 180, 384
2 | 72,  90,  192
2 | 36,  45,   96
2 | 18,  45,   48
2 | 9,   45,   24
2 | 9,   45,   12
2 | 9,   45,    6
3 | 9,   45,    3
3 | 3,   15,    1
5 | 1,    5,    1
  | 1,    1,    1
```

LCM = 2 × 2 × 3 × 3 × 5 × 7 = 1260   LCM = 2 × 2 × 2 × 2 × 2 × 2 × 2 ×
                                           3 × 3 × 5 = 5760

3. We have to find the greatest number which divides (264 – 12) and (336 – 12) exactly

∴ the required number = H.C.F of 252 and 324

```
252 ) 324 ( 1
      –252
       72 ) 252 ( 3
            –216
             36 ) 72 ( 2
                  –72
                   ×
```

HCF of 252 and 324 = 36

Hence, the required largest number = 36

4. First we calculate the HCF of 140, 91 and 63

```
91 ) 140 ( 1
     –91
      49 ) 91 ( 1
           –49
            42 ) 49 ( 1
                 –42
                  7 ) 42 ( 6
                      –42
                       ×
```

HCF of 91 and 140 = 7

then find the HCF of 7 and 63

```
7 ) 63 ( 9
   –63
    ×
```

∴ A physical trainer arranged 7 students in each row of all groups has same number of students.

5. Length of room = 7 m 20 cm = 720 cm

Breadth of room = 5 m 20 cm = 520 cm

If square tiles to be laid in such a way that an exact no. of tiles fit in it = HCF of 720 and 520

```
        520 ⟌ 720 ⟨ 1
            −520
             200 ⟌ 520 ⟨ 2
                 −400
                  120 ⟌ 200 ⟨ 1
                      −120
                       80 ⟌ 120 ⟨ 1
                           −80
                            40 ⟌ 80 ⟨ 2
                               −80
                                ×
```

HCF = 40

So, 40 cm is the greatest length of the side of the square tiles.

6. Let the least no. b = x

   15 is subtracted from least no = x − 15

   (x − 15) is exactly divisible by 48, 72 and 84, then we find LCM of 48, 72 and 84 is 1008

2	48, 72, 84
2	24, 36, 42
2	12, 18, 21
2	6, 9, 21
3	3, 9, 21
3	1, 3, 7
7	1, 1, 7
	1, 1, 1

   Now, x − 15 will be the least no. which will be divisible by the 1008

   ∴ x − 15 = 1008

   $\quad$ x = 1008 + 15

   $\quad$ x = 1023

   Thus, when 15 is subtracted from a given least no, it becomes exactly divisible by 48, 72 and 84 is 1023.

7. HCF of 378 and 588 =

```
    378 ⟌ 588 ⟨ 1
        −378
         210 ⟌ 378 ⟨ 1
             −210
              168 ⟌ 210 ⟨ 1
                  −168
                   42 ⟌ 168 ⟨ 4
                      −168
                        ×
```

   Thus, 42 number of stamps that were paste on each page if number of stamps were same in each page.

8. LCM of 15, 30 and 90 = 90

Largest 4-digit number which is divisible by 90 = 9999 – 9 = 9990

```
90 ) 9999 ( 11
     −90
      99
     −90
      99
     −90
      09
```

Now adding remainder <u>9</u> will get largest 4 digit no. will be 9990 + <u>9</u> = <u>9999</u>

9. First we find the LCM of 4, 6 and 8

LCM of 4, 6 and 8 = 24

So add 2 in 24 = 26

10. Bells toll together = LCM of 4, 8, 12 and 16

```
2 | 4, 8, 12, 16
2 | 2, 4,  6,  8
2 | 1, 2,  3,  4
2 | 1, 1,  3,  2
3 | 1, 1,  3,  1
  | 1, 1,  1,  1
```

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

All bells ring together after every 48 min

Here all bells rang together on 6 : 00 pm.

∴ They all together rang after 6 hrs = 6 + 0:48 = 6 : 48 pm

11. LCM of 8, 12, 16 = 48

```
2 | 8, 12, 16
2 | 4,  6,  8
2 | 2,  3,  4
2 | 1,  3,  2
3 | 1,  3,  1
  | 1,  1,  1
```

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

∴ All 3 of them meet at the same place again after 48 min.

NCERT CORNER

EXERCISE 3.1

1. (a) 24 = 1, 2, 3, 4, 6, 8, 12 and 24
    (b) 15 = 1, 3, 5 and 15

    (c) 21 = 1, 3, 7 and 21
    (d) 27 = 1, 3, 9 and 27

    (e) 12 = 1, 2, 3, 4, 6 and 12
    (f) 20 = 1, 2, 4, 5, 10 and 20

(g) 18 = 1, 2, 3, 6, 9 and 18   (h) 23 = 1 and 23

(i) 36 = 1, 2, 3, 4, 6, 9, 12, 18 and 36

2. (a) 5 = 5, 10, 15, 20, 25   (b) 8 = 8, 16, 24, 32, 40

(c) 9 = 9, 18, 27, 36, 45

3. (i) Multiple of 7   (ii) Factor of 30

(iii) Multiple of 8   (iv) Factor of 20

(v) Factor of 50

EXERCISE 3.2

1. (a) Sum of two odd number is even

(b) Sum of two even number is even

2. (a) False   (b) True   (c) True   (d) False   (e) False

(f) False   (g) False   (h) True   (i) False   (j) True

3. (a) First find prime number between 1 to 100 are 2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, and 97.

Out of these, a pair of prime number's having same digit are (13, 31); (17, 71); (37, 73); (79, 97).

4. Prime number less than 20 are 2, 3, 5, 7, 11, 13, 17 and 19

Composite number less than 20 are 4, 6, 8, 9, 10, 12, 14, 15, 16 and 18

5. (a) Prime no. between 1 and 10 are 2, 5 and 7

∴ Greatest prime between 1 and 10 = 7

6. (a) 44 = 31 + 13

(b) 36 = 5 + 31

(c) 24 = 7 + 17

(d) 18 = 7 + 11

7. Three pairs of prime number whose difference is 2 are (3, 5); (7, 5) and (11, 13)

8. (a) 23

23 is not exactly divisible by any of the prime number 2, 3, 5, 7 and 11. So, it is a prime number

(b) 51

51 is divisible by 3. So, it is not a prime number

(c) 37

37 is not exactly divisible by any of the prime number 2, 3, 5, 7, 11, 13 and 17. So, it is a prime numbers.

(d) 26

26 is exactly divisible by 2 and 13. So, it is not a prime number.

9. Seven consecutive composite number less than 100. So that there is no peime number between them are 90, 91, 92, 93, 94, 95, 96.

10. (a) 21 = 3 + 5 + 13

(b) 31 = 3 + 5 + 23

(c) 53 = 3 + 19 + 31

(d) 61 = 3 + 11 + 47

11. Five paris of prime number whose sum is divisible by 5 are (2, 3); (2, 13); (3, 7); (3, 17); and (7, 13).

12. (a) Prime
    (b) Composite
    (c) Prime, Composite
    (d) 2
    (e) 4
    (f) 2

EXERCISE 3.3

1.

Number	Divisible by								
	2	3	4	5	6	8	9	10	11
(a) 128	✓	✗	✓	✗	✗	✓	✗	✗	✗
(b) 990	✓	✓	✗	✓	✓	✗	✓	✓	✓
(c) 1586	✓	✗	✗	✗	✗	✗	✗	✗	✗
(d) 275	✗	✗	✗	✓	✗	✗	✗	✗	✓
(e) 6686	✓	✗	✗	✗	✗	✗	✗	✗	✗
(f) 639210	✓	✓	✗	✓	✓	✗	✗	✓	✓
(g) 429714	✓	✓	✗	✗	✓	✗	✓	✗	✗
(h) 2856	✓	✓	✓	✗	✓	✓	✗	✗	✗
(i) 3060	✓	✓	✓	✓	✓	✗	✓	✓	✗
(j) 406839	✗	✓	✗	✗	✗	✗	✗	✗	✗

2. We know that a number is divisible by 4, if the number formed by its digit in ten's and unit's places is divisible by 4
   (a) In 572, 72 is divisible by 4. So, 572 is divisible by 4.
   (b) In 726352, 52 is divisible by 4. So, it is divisible by 4.
   (c) In 5500, 00 is divisible by 4. So, it is divisible by 4.
   (d) In 6000, 00 is divisible by 4. So, it is divisible by 4.
   (e) In 12159, 59 is not divisible by 4. So, it is not divisible by 4.
   (f) In 14560, 60 is divisible by 4. So, it is divisible by 4.
   (g) In 21084, 84 is divisible by 4. So, it is divisible by 4.
   (h) In 31795072, 72 is divisible by 4. So, it is divisible by 4.
   (i) In 1700, 00 is divisible by 4. So, it is divisible by 4.
   (j) In 2150, 50 is not divisible by 4. So, it is not divisible by 4.
   Also, we know that a number is divisible by 8, if the number formed by its hundred's, ten's and unit's places is divisible by 8.
   (a) 572 is not divisible by 8
   (b) 726352, 352 is divisible by 8. So, it is divisible by 8.
   (c) In 5500, 500 is not divisible by 8. So, it is not divisible by 8.
   (d) In 6000, 000 is divisible by 8. So, it is divisible by 8.
   (e) 12159, 159 is not divisible by 8. So, it is not divisible by 8.
   (f) 14560, 560 is divisible by 8. So, it is divisible by 8.

(g) 21084, 084 is not divisible by 8. So, it is not divisible by 8.

(h) 3179072, 072 is divisible by 8. So, it is divisible by 8.

(i) 1700, 700 is not divisible by 8. So, it is not divisible by 8.

(j) 2150, 150 is not divisible by 8. So, it is not divisible by 8.

3. We know that a no. is divisible by 6, if it is divisible by 2 and 3 both.

(a) 297144 = It is divisible by 2 and 3 both. So, it is divisible by 6.

(b) 1258 = It is divisible by 2 but not 3. So, it is not divisible by 6.

(c) 4335 = It is not divisible by 2 but divisible by 3. so, it is not divisible by 6.

(d) 61233 = It is not divisible by 2 but divisible by 3. So, it is not divisible by 6.

(e) 901352 = It is divisible by 2 but not 3. So, it is not divisible by 6.

(f) 438750 = It is divisible by 2 and 3 both. So, it is divisible by 6.

(g) 438750 = It is divisible by 2 and 3 both. So, it is divisible by 6.

(h) 12583 = It is not divisible by 2 and 3 both so, it is not divisible by 6.

(i) 639210 = It is divisible by 2 and 3 both. So, it is divisible by 6.

(j) 17852 = It is divisible by 2 but not 3. So, it is not divisible by 6.

4. (a) 5445

Sum of its digit at odd places = 5 + 4 = 9

Sum of its digit even places = 4 + 5 = 9

Difference of these two suns = 9 – 9 = 0

∴ 5445 is divisible by 11

(b) 10824

Sum of its digit at odd places = 4 + 8 + 1 = 13

Sum of its digit at even place = 2 + 0 = 2

Difference of these two sums = 13 –2 = 11

∴ 10824 is divisible by 11.

(c) 7138965

Sum of its digit at odd places = 5 + 9 + 3 + 7 = 24

Sum of digit at even places = 6 + 8 + 1 = 15

Difference of these two sums = 24 – 15 = 9

∴ It is not divisible by 11.

(d) 70169308

Sum of its digit at odd places = 8 + 3 + 6 + 0 = 17

Sum of its digit at even places = 0 + 9 + 1 + 7 = 17

Difference of these two sums = 17 – 17 = 0

∴ It is divisible by 11.

(e) 10000001.

Sum of its digit at odd places = 1 + 0 + 0 + 0 = 1

Sum of its digit at even places = 0 + 0 + 0 + 1 = 1

Difference of these two sums = 1 – 1 = 0

∴ it is divisible by 11.

(f) 901153

Sum of its at odd places = 3 + 1 + 0 = 4

Sum of its digit at even places = 5 + 1 + 9 = 15

Difference of these two sums = 15 –4 = 11

∴ It is divisible by 11.

5. (a) ——6724

6 + 7 + 2 + 4 = 19, we add 2 to 19, the resulting number 21 will be divisible by 3.

∴ The required smallest digit is 2.

Again, if we add 8 to 19, the resulting number 27 will be divisible by 3.

∴ the required greatest digit is 8

(b) 4765——2

4 + 7 + 6 + 5 + 2 = 24, it is divisible by 3.

Hence the required smallest digit is 0.

Again, if we add 9 to 24, the resulting number 33 will be divisible be 3.

∴ The required greatest digit is 9.

6. (a) 92_____389

Sum of its digit at odd places = 9 + 3 + 2 = 14

Sum of its digit at even places = 8 + required digit + 9 = required digit +17

Difference between these sums = required digit + 17 –14 = required digit + 3

(required digit +3) to become 11, we must have the required digit as 8.

Hence, the required smallest digit = 8

(b) 8_____9484

Sum of the digit at odd places = 4 + 4 + required digit

= 8 + required digit

Sum of the digit at even places = 8 + 9 + 8 = 25

Difference between these two sums = 25 – (8 + required digit)

= 17 – required digit

For (17 – required digit) to become 11, we must have the required digit as 6

Hence, the required digit 6.

EXERCISE 3.4

1. (a) 20 and 28

20 = ①, ②, ④, 5, 10 and 20

28 = ①, ②, ④, 7, 14 and 28

Common factor = 1, 2 and 4

(b) 15 and 25

15 = ①, 3, ⑤, 15

25 = ①, ⑤, 25

Common factor = 1 and 5

(c) 35 and 50

35 = ①, ⑤, 7, 35

50 = ①, 2, ⑤, 10, 25, 50

Common factor = 1 and 5

(d) 56 and 120

56 = ①, ②, ④, 7, ⑧, 14, 28, 56

120 = ①, ②, 3, ④, 5, 6, ⑧, 10, 12, 15, 20, 30, 40, 60 and 120

Common factor = 1, 2, 4 and 8

2. (a) 4, 8 and 12

4 = ①, ②, ④

8 = ①, ②, ④, 8

12 = ①, ②, 3, ④, 6, 12

Common factor = 1, 2, 4

(b) 5, 15 and 25

5 = ①, ⑤

15 = ①, 3, ⑤, 15

25 = ①, ⑤, 25

Common factor 1 and 5

3. (a) 6 and 8

Multiples of 6 = 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, ...

Multiples of 8 = 8, 16, 24, 32, 40, 48, 56, 64, 72, 80, ...

First 3 common multiples = 24, 48 and 72

(b) 12 and 18

12 = 12, 24, 36, 48, 60, 72, 84, 96, 108, ...

18 = 18, 36, 54, 72, 90, 108,....

The first three common multiples = 36, 72 and 108

4. Since 3 and 4 are Co-prime

∴ Common multiples of 3 and 4 are 12

∴ Common multiples of 3 and 4 less than 100.

are 12, 24, 36, 48, 72, 84, 96

5. (a) 18 and 35

18 = 1, 2, 3, 6, 9 and 18

35 = 1, 5, 7, 35

Common factor = 1

Thus, 18 and 35 are co-prime.

(b) 15 and 37

15 = 1, 3, 5 and 15

37 = 1, 37

Common factor = 1

Thus, 15 and 37 are co-prime.

(c) 30 and 415

Since 5 is a common factor of 30 and 415.

∴ 30, 415 are not co-prime.

(d) 17 and 68

68 ÷ 17 = 4 i.e., 17 is common factors of 17 and 68

∴ 17 and 68 are not co-prime.

(e) 216 and 215

Since 1 is the only common factor of 216 and 215

∴ 216 and 215 are co-prime.

(f) 81 and 16

Since 1 is the only common factor of 81 and 16

∴ 216 and 215 are co-prime.

6. 5 and 12 are co-prime

∴ it is also divisible by 5 × 12 = 60

7. Factors of 12 are 1, 2, 3, 4, 6, 12

∴ the number also be divisible by 1, 2, 3, 4 and 6.

EXERCISE 3.5

1. (a) False   (b) True   (c) True   (d) True   (e) False

(f) False   (g) True   (h) True   (i) False

2. (a)

```
        60
       /  \
      6  ×  10
     / \    / \
    2 × ③  5 × ②
```

(b)

```
        60
       /  \
     30  ×  ②
     / \
    10 ×  ③
    / \
   ⑤ × ②
```
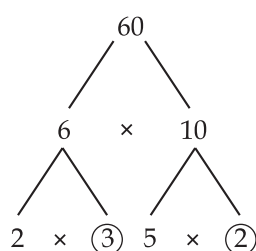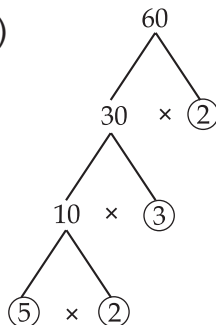
3. 1 and the composite number itself are not included in the prime factorization of a composite number.

4. Greatest 4-digit number = 9999

```
  3 | 9999
  3 | 3333
 11 | 1111
101 |  101
    |    1
```

∴ 9999 = 3 × 3 × 11 × 101

5. Smallest 5-digit number is 10,000

```
 2 | 10000
 2 |  5000
 2 |  2500
 2 |  1250
 5 |   625      10,000 = 2 × 2 × 2 × 2 × 5 × 5 × 5 × 5
 5 |   125
 5 |    25
 5 |     5
   |     1
```

6.
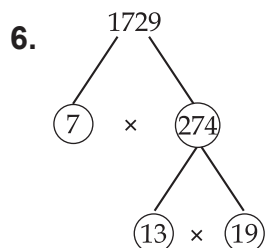
Prime factors of 1729 = 7 × 13 × 19

The difference of two consecutive prime factors is 6

7. Among three consecutive numbers, there must be one even number and one multiple of 3.
Thus, the product must be multiple of 6.
Example; (i) 2 × 3 × 4 = 24
         (ii) 4 × 5 × 6 = 120

8. 3 + 5 = 8 and 8 is divisible by 4.
5 + 7 = 12 and it is divisible by 4.
7 + 9 = 16 and it is divisible by 4.
9 + 11 = 20 and it is divisible by 4

9. In (b) and (c) prime factorization has been done.

10. The prime factorization of 45 = 5 × 9
25110 is divisible by 5 as '0' is at its unit place.
25110 is divisible by 9 as sum of digit is divisible by 9
∴ the number must be divisible by 5 × 9 = 45.

11. No, number 12 is divisible by both 6 and 4 but 12 is not divisible by 24.

12. 2 × 3 × 5 × 7 = 210

<p align="center">EXERCISE 3.6</p>

1. (a) 18, 48

```
        2 | 48
2 | 18  2 | 24
3 |  9  2 | 12
3 |  3  2 |  6
  |  1  3 |  3
        |   1
```

∴ 18 = 2 × 3 × 3
  48 = 2 × 2 × 2 × 2 × 3
HCF = 2 × 3 = 6

(b) 30, 42
30 = 2 × 3 × 5
42 = 2 × 3 × 7
HCF = 2 × 3 = 6

(c) 18, 60
18 = 2 × 3 × 3
60 = 2 × 2 × 3 × 5
HCF = 2 × 3 = 6

(d) 27, 63
27 = 3 × 3 × 3
63 = 3 × 3 × 7
HCF = 3 × 3 = 9

(e) 36, 84
36 = 2 × 2 × 3 × 3
84 = 2 × 2 × 3 × 7
HCF = 2 × 2 × 3 = 12

(f) 34, 102
      34 = 2 × 7
      102 = 2 × 3 × 17
      HCF = 2 × 17 = 34

(g) 70, 105, 175
      70 = 2 × 5 × 7
      105 = 3 × 5 × 7
      175 = 5 × 5 × 7
      ∴ HCF = 5 × 7 = 35

(h) 91, 112, 49
      91 = 7 × 13
      112 = 2 × 2 × 2 × 2 ×7
      49 = 7 × 7
      ∴ HCF = 7

(i) 18, 54, 81

```
2 | 18        2 | 54        3 | 81
3 |  9        3 | 27        3 | 27
3 |  3        3 |  9        3 |  9
   |  1       3 |  3        3 |  3
              |  1          |  1
```

      18 = 2 × 3 × 3
      54 = 2 × 3 × 3 × 3
      81 = 3 × 3 × 3 × 3
      HCF = 3 × 3 = 9

(j) 12, 45, 75
      12 = 2 × 2 × 3
      45 = 3 × 3 × 5
      75 = 3 × 5 × 5
      HCF = 3

2. (a) HCF of two consecutive number = 1
   (b) HCF pf two consecutive even number = 2
   (c) HCF of two consecutive odd number = 1

3. The answer is incorrect. The correct HCF of two co-prime number 4 and 15 = 1

EXERCISE 3.7

1. Both the bags containing 75 kg and 69 kg of fertiliser. So, the weight must be an exact divisor of the capacities of both the bags. Moreover this capacities should be maximum. Thus maximum weight will be the HCF of 75 and 69.

```
3 | 75        3 | 69
5 | 25       23 | 23
5 |  5          |  1
   |  1
```

      75 = 3 × 5 × 5
      69 = 3 × 23
      HCF of (75, 69) = 3 kg

2. These boys step off together after those distance intervals which are common multiples of 63 cm, 70 cm and 77 cm.

So, we find LCM of 63, 70 and 77

2	63, 70, 77
3	63, 35, 77
3	21, 35, 77
5	7, 35, 77
7	7, 7, 77
11	1, 1, 11
	1, 1, 1

$\therefore$ LCM (70, 63, 77) = 2 × 3 × 3 × 5 × 7 × 11 = 6930

$\therefore$ The minimum distance each should cover so that all can over the distance in complete step = 6930 cm = 69m 30cm.

3. The longest tape that can measure the three dimensions of the room. we can find HCF (825cm, 675cm and 450cm)

2	450
3	225
3	75
5	25
5	5
	1

3	675
3	225
3	75
5	25
5	5
	1

3	825
5	275
5	55
11	11
	1

450 = 2 × 3 × 3 × 5 × 5
675 = 3 × 3 × 3 × 5 × 5
825 = 3 × 5 × 5 × 11
HCF = 3 × 5 × 5 = 75

$\therefore$ The required length of the longest tape = 75 cm.

4. LCM of 6, 8 and 12 = 2 × 2 × 2 × 3 = 24

The smallest 3-digit number = 100

To find the number, we have to divide 100 by 24

$$24\overline{)100}(4$$
$$\underline{-96}$$
$$4$$

$\therefore$ The required number = 100 + (24 – 4) = 120

5. LCM of 8, 10, and 12 = 2 × 2 × 2 × 3 × 5 = 120

2	8, 10, 12
2	4, 5, 6
2	2, 5, 3
3	1, 5, 3
5	1, 5, 1
	1, 1, 1

The largest three digit number = 999

Now, $120 \overline{)999} 8$
$\quad\quad\quad -960$
$\quad\quad\quad\overline{\quad 39}$

∴ The required number = 999 – 39 = 960

6. LCM of 48, 72, 108 = 2 × 2 × 2 × 2 × 3 × 3 × 3 = 432

2	48, 72, 108
2	24, 36, 54
2	12, 18, 27
2	6, 9, 27
3	3, 9, 27
3	1, 3, 9
3	1, 1, 3
	1, 1, 1

After 432 sec. the lights changes simultaneously 432 second = 7 min. 12 second

∴ The time = 7 a.m. + 7 min. 12 sec

$\quad\quad$ = 7:07:12 a.m.

7. The maximum capacity of container = HCF (403, 434, 465)

factors of 403 = 13 × 31

factors of 434 = 2 × 7 × 31

factors of 465 = 3 × 5 × 31

HCF = 31

∴ 31 liters of container is required to measure the quantity.

8. LCM of 6, 15, and 18 = 2 × 3 × 3 × 5 = 90

2	15, 18, 6
3	15, 9, 3
	5, 3, 1

∴ The required number = 90 + 5 = 95

9. LCM of 18, 24 and 32 = 2 × 2 × 2 × 2 × 2 × 3 × 3 = 288

2	18, 24, 32
2	9, 12, 16
2	9, 6, 8
2	9, 3, 4
2	9, 3, 2
3	9, 3, 1
3	3, 1, 1
	1, 1, 1

The smallest 4-digit number = 1000

Now,

$$288 \overline{)1000} (3$$
$$\underline{-864}$$
$$136$$

∴, the required number is 1000 + 288 −136 = 1152

10. (a) LCM of 9 and 4 = 2 × 2 × 3 × 3 = 36

2	4, 9
2	2, 9
3	1, 9
3	1, 3
	1, 1

(b) LCM of 12 and 5 = 2 × 2 × 3 × 5 = 60

2	12, 5
2	6, 5
3	3, 5
5	1, 5
	1, 1

(c) 6 and 5

LCM of 6 and 5 = 2 × 3 × 5 = 30

Yes, the LCM is equal to the product of two number's in each case. And LCM is also the multiple of 3

(d) LCM of 15 and 4 = 2 × 2 × 3 × 5 = 60

2	4, 15
2	2, 15
3	1, 15
5	1, 5
	1, 1

11. (a) LCM of 5 and 20 = 2 × 2 × 5 = 20

(b) LCM 6 and 18 = 3 × 3 × 2 = 18

(c) LCM of 12 and 48 = 2 × 2 × 2 × 2 × 3 = 48

(d) LCM of 9 and 45 = 3 × 3 × 5 = 45

From these all cases, we can conclude that if the smallest number if the factor of largest number then the LCM of these two number's is equal to that of larger number.

SUBJECT ENRICHMENT EXERCISE

I.

    1. Has exactly two factors   **2.** 2   **3.** 3, 3, 3, 5

    4. 5886   **5.** 5, 9   **6.** 1

    7. 999   **8.** Twin primes   **9.** 18, 25

  10. 0

II.

    (a) 5   (b) 290   (c) 1

    (d) 99995   (e) 3, 5 and 7   (f) 9,99,000

III.

    (a) False   (b) True   (c) True

    (d) False   (e) True
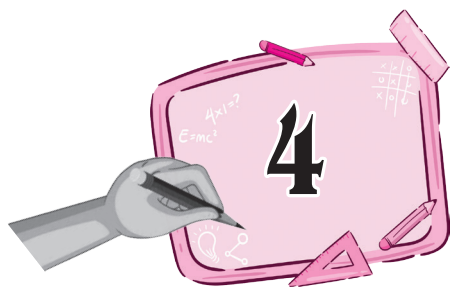
Basic Geometrical Ideas

4

EXERCISE 4.1

1. (a) Point A, Point B, and Point C.
   (b) $\overline{AB}, \overline{BC}, \overline{AC}$

2. (a) The three rays are $\overrightarrow{PQ}, \overrightarrow{PR}, \overrightarrow{PS}$
   (b) The three angles are ∠QPR, ∠RPS, ∠QPS.

3. (a) Points – P, Q, R
   (b) Lines – $\overleftrightarrow{QR}$
   (c) Line segments – $\overline{QR}, \overline{QP}$
   (d) Rays – $\overrightarrow{QR}, \overrightarrow{QP}$
   (e) Angles – ∠PQR

4. (a) $\overleftrightarrow{QS}$ – line
   (b) $\overrightarrow{QS}$ – Ray
   (c) $\overline{PS}$ – line segment
   (d) $\overrightarrow{QS}$ – Ray
   (e) $\overleftrightarrow{PS}$ – line
   (f) $\overline{PQ}$ – line segment

5. (a) Two lines are drawn in the Fig. i.e., $\overleftrightarrow{AB}, \overleftrightarrow{PE}$
   (b) Lines AB and PE intersect each other at 0.

6. (i) Point P lies on $\overleftrightarrow{AB}$
   (ii) $\overleftrightarrow{XY}$ and $\overleftrightarrow{PQ}$ intersect at M
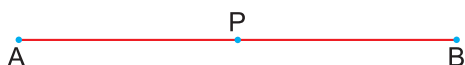
   (iii) Line l contains points E at F but not D.
   (iv) $\overrightarrow{OP}$ and $\overrightarrow{OQ}$ meet at O.
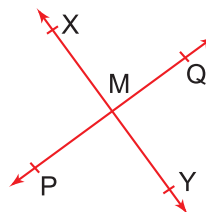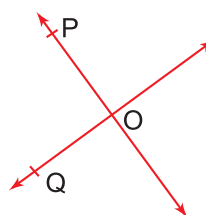
EXERCISE 4.2

1. (a) Open curves
   (b) Complex curves
   (c) Simple curves
   (d) Closed curves
   (e) Complex curves
   (f) Closed curves
   (g) Complex curves
   (h) Closed curves

2. (a) diagonal = ZX
   (b) oppsite sides are (ZW, XY); (ZY, WX)

(c) pairs of adjacent sides are (ZW, WX); (WX, XY); (XY, ZY); (ZY, WZ)

(d) pairs of adjaent angles are (W,X); (X, Y); (Y, Z); (Z, W).

(e) pairs of opposite angles are (∠W, ∠Y); (∠X, ∠Z)

3. (a) Point A, B, C are in the interior of the closed fig.

(b) Point E, D, H is in the exterior of the closed fig.

(c) Point F and G are on the boundary of the closed fig.

4. (a) Yes, it is a curve

(b) Yes, it is closed

EXERCISE 4.3

1. (a) Arms: PQ, QR

 Vertices: Q

(b) Arms:- AB, BC

 Vertices:- B

2. (a) 6 angles are formed in the adjacent fig.

(b) ∠SOR is adjacent to ∠ROQ.

 ∠ROQ is adjacent to ∠QOP.

 ∠SOR is adjacent to ∠ROP.

 ∠SOQ is adjacent to ∠QOP.

EXERCISE 4.4

1. (a) △ PQR

(c) △ MNO

(b) △ XYZ

(d) △ STU

2. (a) Sides are MN, NO and OM

(b) Sides are PQ, QR, RP

3. (a) 3 triangles are △ ABC, △ ABD, △ ACD

(b) 6 triangles are △ ABC, △ ABE, △ AED, △ ADC, △ AEC, △ ABD

(c) 8 triangles are △ AOB, △ BOC, △ COD, △ AOD, △ BCD, △ ABD, △ ACD, △ ABC.

4. (a) Point E and C are in the interior region of △ XYZ

(b) Point A and B lies on △ XYZ

(c) Point F and D belong to the exterior of △ XYZ

(d) Point A, B, C and E

5.

(a)   (b)   (c)
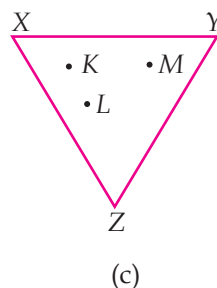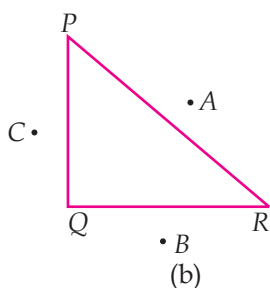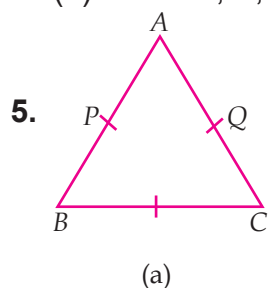
6. (a) **Triangle:** Triangle is a closed plane fig. formed by three non-parallel line segment. Triangle have 3 sides 3 vertices and 3 angles.

(b) **Scalene Triangle:** If in a triangle, all three sides are unequal, then it is called a scalene triangle.

(c) **Acute Triangle:** If each angle is less than 90°, then the triangle is called an Acute triangle.

(d) **Right Triangle:** If any one angle is a right angle then the △ is called right triangle.

(e) **Obtuse Triangle:** If any one angle is greater than 90°, then the △ is called Obtuse triangle
(f) **Interior of a triangle:** The interior of the triangle is the set of all points inside a △.
(g) **Exterior of a triangle:** The part made up by all such point which are not encloses by triangle is called the exterior of triangle.

EXERCISE 4.5

1. (i) 4 pairs (AB, BC); (BC, CD); (CD, AD); (AD, AB).
(ii) 2 pairs of opposite sides
(AB, CD) and (AD, BC)
(iii) 4 pairs
(∠A and ∠B); (∠B and ∠C); (∠C and ∠D); (∠D and ∠A)
(iv) 2 pairs
(∠A and ∠C); (∠B and ∠D)

2. (a) $\overline{AB}, \overline{BC}, \overline{CD}, \overline{DA}$
(b) ∠A, ∠B, ∠C and ∠D
(c) (AB, BC); (BC, CD); (CD, AD); (AD, AB).
(d) (∠A, ∠B); (∠B, ∠C); (∠C, ∠D); (∠D, ∠A)
(e) (AB, CD); (AD, BC)
(f) (∠A, ∠C); (∠B, ∠D)
(g) AC and BD
(h) Point P and Q
(i) Point X and Y
(j) Point S and R
(k) Point P, Q, R and S

3. (a) adjacent angles
(b) Opposite angles
(c) End point / vertex
(d) Opposite

EXERCISE 4.6

1. (a) False
Correct statement
A line segment with one end at the centre and the other end on the circle is called a radius
(b) True
(c) False
Correct statement
Any line segment with its end points on the circle is called a chord
(d) True
(e) False
The diameter o a circle is the longest chord of the circle
(f) True
(g) True
(h) True
(i) True

2.
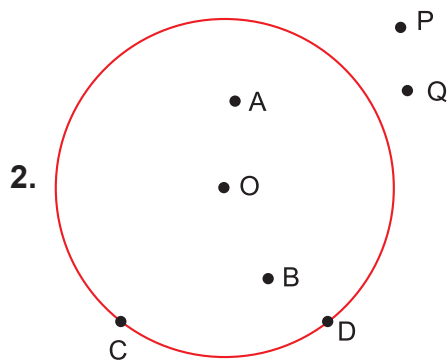
(a) Point P and Q are in the exterior of the circle

(b) Point A and B are in the interior of the circle

(c) Point C and D on the circle

(d) Point A, B, C and D in the circular region

3. (i) OB   –   Radius

    (ii) AB   –   Diameter

    (iii) O   –   Centre

    (iv) AOE   –   Sector

    (v) BD   –   Chord

4. $\overline{OP}$ = radius

$\overline{OR}$ = radius

$\overline{AB}$ = Chord

$\overset{\frown}{AQB}$ = Arc

O = Centre

NCERT CORNER

EXERCISE 4.1

1. (a) 5 points are point D, E, O, B and C.

    (b) A line is $\overleftrightarrow{BD}$, $\overleftrightarrow{OE}$, $\overleftrightarrow{DE}$, $\overleftrightarrow{OB}$

    (c) 4 rays are $\overrightarrow{OC}$, $\overrightarrow{OB}$, $\overrightarrow{OD}$ and $\overrightarrow{ED}$

    (d) 5 line segments are $\overline{DE}$, $\overline{OE}$, $\overline{OC}$, $\overline{OB}$, $\overline{OD}$

2. $\overline{AB}$, $\overline{AC}$, $\overline{AD}$, $\overline{BC}$, $\overline{BD}$, $\overline{CD}$, $\overline{BA}$, $\overline{CA}$, $\overline{DA}$, $\overline{CB}$, $\overline{DB}$, $\overline{DC}$

3. (a) a line containing E = $\overleftrightarrow{AE}$ or $\overleftrightarrow{FE}$

    (b) a line passing through A = $\overleftrightarrow{AE}$

    (c) line on which O lies = $\overleftrightarrow{CO}$

    (d) Two pairs of intersecting line = $\overleftrightarrow{AD}$, $\overleftrightarrow{CO}$ and $\overleftrightarrow{EF}$, $\overleftrightarrow{AE}$

4. (a) Infinite number of lines can pass thorugh one given point.
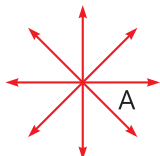
(b) Only one line can pass through two given points.

5. (a)   (b)

(c)   (d)
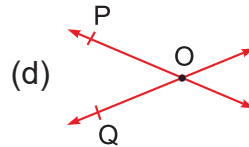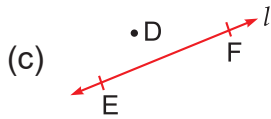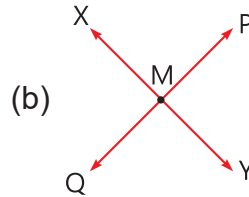
6. (a) True   (b) True   (c) True   (d) False   (e) False
    (f) False   (g) True   (h) False   (i) False   (j) False
    (k) True

EXERCISE 4.2

1. (a) Open curve   (b) Closed curve   (c) Open curve   (d) Closed curve
    (e) Closed curve

2. (a) Open curves

(b) Closed Curves

3. A
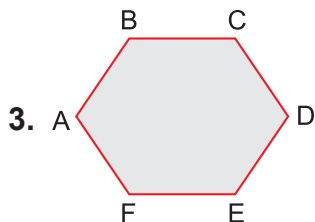
Polygon ABCDEF

4. (a) Yes, it is a curve.
    (b) Yes, it is closed.

5. (a)   (b)

(c) Polygon with two sides cannot be draw.

EXERCISE 4.3

1. There are 4 angles in given fig.
    ∠A, ∠B, ∠C and ∠D.

2. (a) A   **(b)** C, A, D   **(c)** E, O, B, F

3. (a)
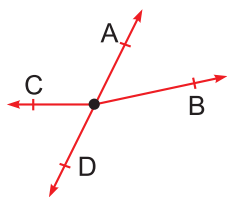
(b)
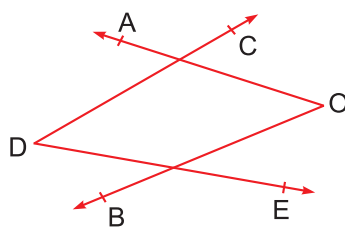
(c)
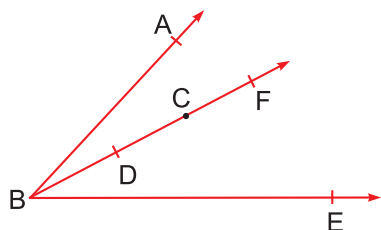
(c)
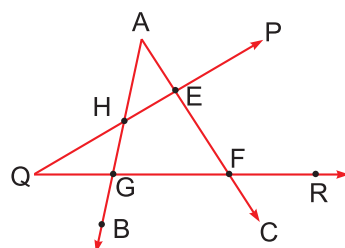
(e)
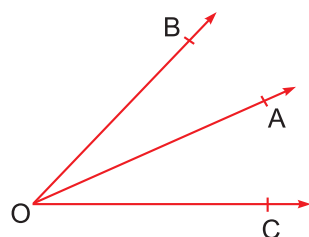
EXERCISE 4.4

1.
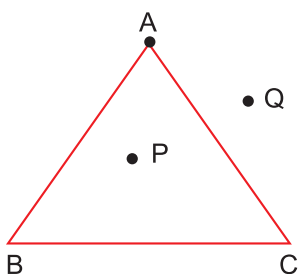
A is neither interior of the fig nor exterior of △.

It is a vertex

2. (a) △ ABC, △ABD, △ADC

    (b) ∠B, ∠C, ∠BAD, ∠CAD, ∠ADB, ∠ADC, ∠A.

    (c) AB, BC, CA, AD, BD, DC.

    (d) △ABC and △ABD

EXERCISE 4.5

1.
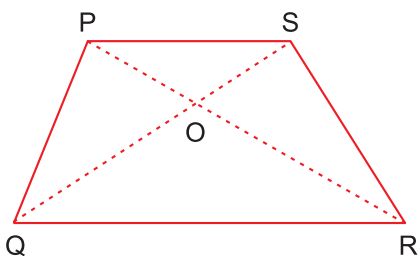
Diagonal PR and diagonal QS meet at O, which is inside the quad.

2. (a) Pair of opposite side - KL and MN, KN and LM

(b) Pair of opposite $\angle_s$ = $\angle$K and $\angle$M, $\angle$L and $\angle$N

(c) Pairs of adjacent sides = KL and LM, KN and MN.

(d) Pairs of adjacent $\angle_s$ = $\angle$K and $\angle$N, $\angle$L and $\angle$M.
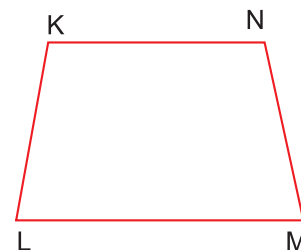
EXERCISE 4.6

1. (a) O is the centre
(b) 3 radii are OB, OA, OC

(c) AC is the diameter
(d) ED is a chord

(e) Point P and O are two points in the interior
(f) Point Q is a point in the exterior

(g) AOB is a sector
(h) $\overgroup{ED}$ is a segment

2. (a) Yes, every diameter of a circle is also a chord.

(b) No, every chord of a circle also a diameter

3.
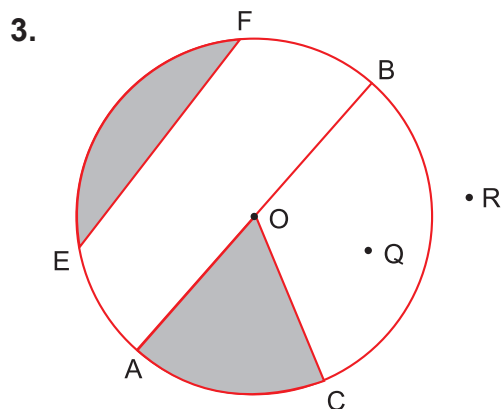
4. (a) True
(b)True

SUBJECT ENRICHMENT EXERCISE

I.

1. Infinite length
2. No length
3. 3 collinear points

4. Same line
5. One end point
6. a closed curve

7. Closed figure
8. One vertex and two arms
9. Four sides

10. Lies in its interior

II.

(a) Flat
(b) Chord
(c) Starting point

(d) Infinite
(e) Quadrilateral
(f) Half

(g) Arc
(h) 360°

III.

(a) False
(b) True
(c) True

(d) True
(e) True
(f) False

(g) False

5

Understanding Elementary Shapes

EXERCISE 5.1

1. The disadvantage in comparing line segments by mere observation is that sometimes the difference in lengths between two line segments may not be adequate. So, we cannot be always sure about our usual judgement.

2. It is better to use a divider than a ruler, because the thickness of the ruler may cause difficulties in reading of the length. However, the divider gives up accurate measurement. $\therefore$ it is better to use a divider than a ruler, while measuring the length of a line segment.

3.

A   C   B

Length of $\overline{AB}$ = 8 cm

Length of $\overline{CB}$ = 4 cm

Length of $\overline{AC}$ = 4 cm

Yes, AB = AC + CB

    8 = 4 + 4

    8 = 8

4.

    6 cm   4 cm

A   B   C
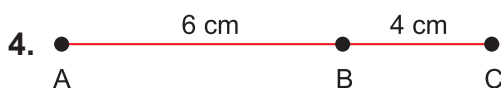
Point B lies between the point A and Point C.

5. (a) No,

     PR + PQ = PQ

     But in this equation, PQ + QR = PR. This is wrong.

     because PR = 3.5, QR = 1.5 cm, PQ = 5 cm

                 PQ + QR = PR

                  5 + 1.5 = 3.5

                     6.5 $\neq$ 3.5

     $\therefore$ this statement is wrong.

   (b) PR − PQ = QR

       3.5 cm − 5 cm = 1.5 cm

       − 1.5 cm $\neq$ 1.5 cm

6. AB = 1.5 cm, BC = 2 cm, AC = 2 cm

   (a) AB + BC > AC

       1.5 + 2 > 2

       3.5 > 2

       True

(b) BC + AC > AB
2 + 2 > 1.5
4 > 1.5
True

(c) AC + AB > BC
2 + 1.5 > 2
3.5 > 2
True

EXERCISE 5.2

1. (b) ∠COD – Acute – 15°
   (d) ∠COI – Right – 90°
   (f) ∠EOM – Obtuse – 120°
   (h) ∠GOL – Acute – 75°
   (j) ∠COM – Obtuse – 150°
   (l) ∠IOM – Acute – 60°
   (n) ∠LOE – Obtuse – 105°
   (p) ∠MOG – Right – 90°

   (c) ∠BOK – Obtuse –135°
   (e) ∠EOK –Right – 90°
   (g) ∠GOM –Right – 90°
   (i) ∠BOL – Obtuse – 150°
   (k) ∠BOH – Right – 90°
   (m) ∠DOK – Obtuse –105°
   (o) ∠JOA – Obtuse – 135°

2. (a) ∠ABC = Obtuse
      ∠DAB = Acute
      ∠ADC = Obtuse
      ∠BCD = ACute

   (b) ∠ADC = Right
      ∠DCB = Right
      ∠ABC = Right
      ∠BAD = Right

   (c) ∠ABC = Obtuse
      ∠BCD = Right
      ∠CDE = Right
      ∠DEA = Obtuse

   (d) ∠ADE = Acute
      ∠BAD = Obtuse
      ∠AED = Right
      ∠AEC = Straight
      ∠BED = Straight

3. (a) 90° = Right angle
   (c) 350° = Reflex angle
   (e) 89° = Acute angle
   (g) 310° = Reflex angle
   (i) 27° = Acute angle
   (k) 170° = Obtuse angle

   (b) 180° = Straight angle
   (d) 105° = Obtuse angle
   (f) 98° = Obtuse angle
   (h) 270° = Reflex angle
   (j) 125° = Obtuse angle
   (l) 30° = Acute angle

4. (a) 3 : 00 p.m = Right angle = 90°
   (b) 12 Noon = Complete angle = 360°
   (c) 8:00 a.m = Obtuse angle = 120°
   $$\left[\frac{360}{12} \times (12-8)\right]$$
   (d) 9:00 am = 90° = Right angle
   (e) 10.00 p.m = 60° = Acute angle $\left[\frac{360}{12} \times (12-10)\right]$
   (f) 4:00 p.m = 120° = Acute angle $\left[\frac{360}{12} \times 4\right]$

5. (a) ∠x = 90°
   $$\left[\frac{360}{12} \times 3\right]$$

(b)

$$\angle x = 60°$$
$$1 \text{ revolution} = 360°$$
$$\therefore 12 \text{ hours} = 360°$$
$$1 \text{ hour} = \frac{360}{12} = 30°$$
$$2 \text{ hour} = 30 \times 2 = 60°$$

(c)

$$\angle x = 120°$$
$$12 \text{ hours} = 360°$$
$$1 \text{ hour} = 30°$$
$$(12 - 8) = 4 \text{ hours} = 30 \times 4 = 120°$$

(d)

$$\angle x = 60°, \angle y = 120°$$
$$1 \text{ revolution} = 360°$$

circle is divided into 6 equal parts

$$6 \text{ parts} = 360°$$
$$1^{st} \text{ part} = \frac{360}{6} = 60°$$
$$\angle x = 4^{th} \text{ part} - 3^{rd} \text{ part} = 60°$$
$$= 60 \times 4 - 60 \times 3 = 240 - 180 = 60°$$
$$\angle y = 3^{rd} \text{ part} - 1^{st} \text{ part}$$
$$= 60 \times 3 - 60 \times 1 = 180 - 60 = 120°$$

(e)

$$\angle x = 90°, \ \angle y = 45°$$

This circle is divided into 8 equal parts

$$8 \text{ parts} = 360°$$
$$1^{st} \text{ part} = \frac{360}{8} = 45°$$
$$\angle x = 7^{th} \text{ part} - 5^{th} \text{ part}$$
$$= 7 \times 45° - 5 \times 45°$$
$$= 315° - 225°$$
$$= 90°$$

(f)

$$\angle x = 60°, \ \angle y = 120°$$
$$6 \text{ parts} = 360°$$
$$1 \text{ part} = \frac{360}{6} = 60°$$
$$\angle y = 5 \text{ part} - 3 \text{ part}$$
$$= 5 \times 60° - 3 \times 60°$$
$$= 300° - 180° = 120°$$

EXERCISE 5.3

1. (a) No, this paris of lines are not perpendicular to each other.

(b) Yes, this pairs of line are perpendicular to each other.

(c) No, this pairs of lines are perpendicular to each other.

2. $\overline{MN} \perp \overline{PQ}$ and $\overline{TU} \perp \overline{PQ}$

1. (a) 20 cm, 10 cm, 14 cm

In △ all side are unequal. So, this triangle is a scalene triangle.

(b) 8 m, 10 m, 7 m

In △, all sides are unequal. So, this triangle is a scalene triangle.

(c) 10m, 10m, 10m

In △, all sides are equal. So, this triangle is an equilateral triangle.

(d) 14m, 12m, 14m

In △, two sides are equal. So, this triangle is an isosceles triangle.

(e) 6m, 9m, 11m

In △, all sides are different. So, this triangle is a scalene triangle.

(f) 5 cm, 6 cm, 7 cm

In △, all sides are different. So, this triangle is a scalene triangle.

2. (a) 30°, 70°, 80°

Each angles are less than 90°. So, this triangle is acute-angled triangle.

(b) 25°, 60°, 90°

Here, One angle of triangle is 90°. So, this triangle is right-angled triangle.

(c) 10°, 20°, 150°

Here, One angle is greather than 90°. So, this triangle is obtuse triangle

(d) 60°, 60°, 60°

Here all angles are less than 90°. So, this triangle is acute triangle.

(e) 70°, 70°, 70°

Here, all angles are less than 90°. So, this triangle is acute-angled triangle.

(f) 20°, 20°, 140°

Here, one angle is greater than 90°. So, this triangle is obtuse-angle triangle.

3. (a) In fig AB ⊥ BC

∴ ∠x = 40°

(b) In fig. XY is straight line.

∠x + 60° = 180°

∠x = 180° − 60°

∠x = 120°

4. (a)

(b)

(c)

(d)

(e)

(f)
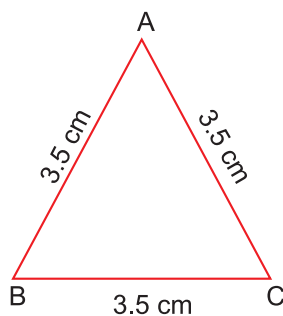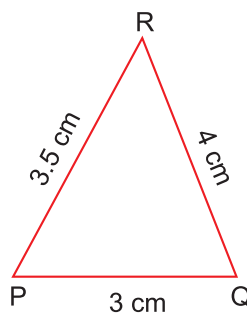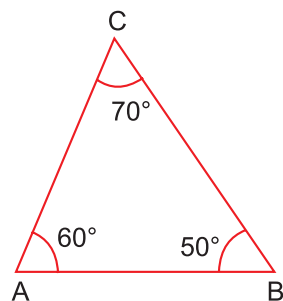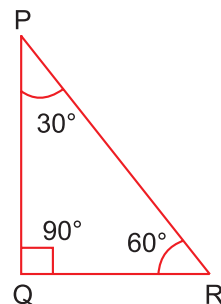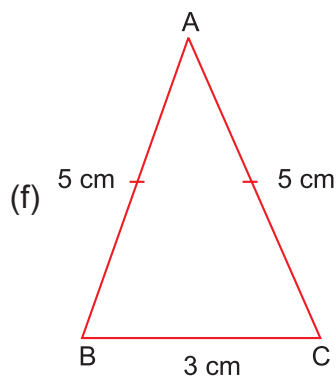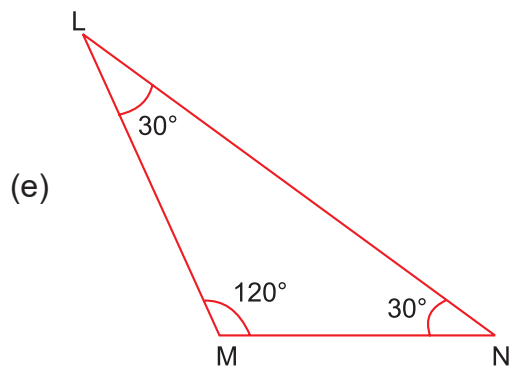
5. (a) Sum of all of △ = 180°
  60° + 70° + 3rd angle = 180°
  3rd angle = 50°
  So, This is scalene triangle

  (b) This is an isosceles triangle.

  (c) This is an isosceles trianlge.

  (d) This is a scalene triangle.

  (e) This is a scalene triangle.

  (f) This is a scalene triangle.

EXERCISE 5.5

1. (a) all, all four   (b) opposite, all four

  (c) Two   (d) right angles

  (e) rhombus or square

2. Rectangle

3. If the adjacent side DA and AB of a ||gm ABCD are 3cm each, then all sides are 3 cm. because opposite sides of ||gm are equal.
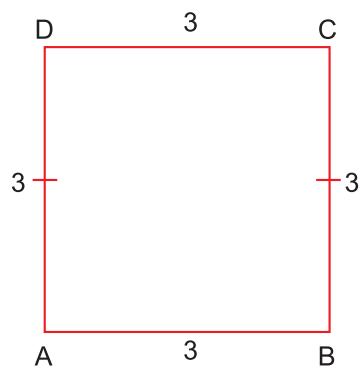
  ∴ AB = CD and AD = BC in ||gm ABCD.
  Its another name is square.

5. (a) Yes, $\overline{AD} = \overline{AB}$

  (b) Yes, ∠ADO = ∠ABO because $\overline{AD} = \overline{AB}$

  (c) Yes, ∠DAO = ∠BAO
      In △AOB and △AOD
      ∠ABO = ∠ADO

∠AOB = ∠AOD   (each 90°)

∠ABO + ∠AOB + ∠BAO = ∠ADO + ∠AOD + ∠DAO

∠BAO = ∠DAO

(d) Yes, ΔAOB = ΔAOD

If all angles are equal of both Δ, then both triangles are equal.

(e) Yes, ∠AOB = ∠AOD = 90°

EXERCISE 5.6

1. No, it is not a regular polygon because all angles of a rhombus are not equal.

2. (a) Regular polygon
   (b) Irregular polygon
   (c) Regular polygon
   (d) Regular polygon
   (e) Irregular polygon
   (f) Irregular polygon.

3.
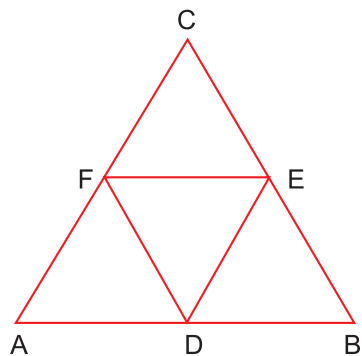
5 regular polygon are formed. ΔABC, ΔDEF, ΔCEF, ΔADF, ΔBDE.

4. (a) It is not a polygon because it is not made by line segment.
   (b) It is a pollygon because it is made by line segments.
   (c) It is not a polygon because it is not made only by line segments.
   (d) It is a polygon because it is made by line-segments

5. (a) regular
   (b) irregular
   (c) irregular
   (d) regular
   (e) irregular

6. (a) **Trapezium:** A quad. having exactly one pairs of parallel sides is called a trapezium.
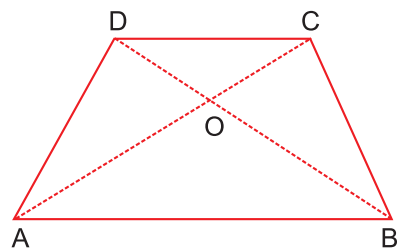
In Fig. AB || CD.

• AD is not parallel BC

• AC and BD are the diagonals.

(b) **Parallelogram:** A parallelogram is a quad in which both pairs of opposite sides are parallel. In fig., ABCD is a ||gm where AB || CD and AD || BC.
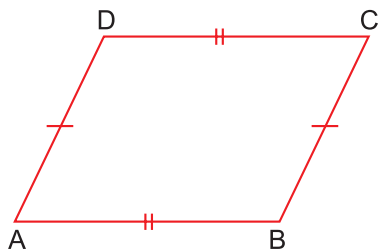
Properties of parallelogram
- The opposite sides are parallel and equal
- The opposite angles are equal
- The diagonals bisect each other.

(c) Rectangles: A rectangle is a parallelogram in which each angle is a right angle. So, in a rectangle, the opposite sides are parallel and equal. Opposite angles are equal and diagonals bisect each other. In fig. PQRS is rectangle.
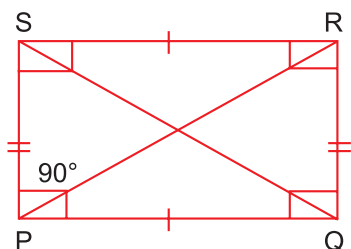
EXERCISE 5.7

1. (a) Regular polygon
(b) Pentagon
(c) 900°
(d) 6 sides
(e) Quadrilateral

2. (a) Yes
(b) Yes
(c) Yes
(d) No, because circle have no sides.
(e) No, because cube is a 3-dimensional, solid fig.

3. (a) Pentagon
(b) Octagon
(c) Triangle
(d) Qudrilateral / kite
(e) Hexagon

4. (a) Dice and gift box
(b) Match box and book
(c) Ice-cream cone and Brithday cap
(d) Football and marble
(e) Pencil stand and water bottle

5. (a) Sphere
(b) Cone
(c) Cube
(d) Cuboid
(e) Cuboid
(f) Cylinder

NCERT CORNER

EXERCISE 5.1

1. There may be chance of error due to improper viewing.

2. Because the thickness of the ruler may cause difficulties in reading off her length. However divider give up accurate measurement.

3. A ——— C ——— B

Yes, AB = 5 cm,   AC = 2.6 cm,   BC = 2.4 cm

AC + CB = (2.6 + 2.4) cm = 5cm = AB

4. AC is the longest line segment, thus B is the point between A and C.

5.   AD = 3 units,   DG = 3 units

AD = DG

Thus, D is the mid-point.

6. B is the mid-point of $\overline{AC}$

∴   AB = BC   (1)

And C is the mid point of $\overline{BD}$

∴   BC = CD   (2)

From (1) and (2) equation

AB = CD

7. Yes, sum of two sides of a △ is always greater than the third sides
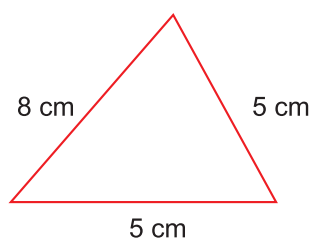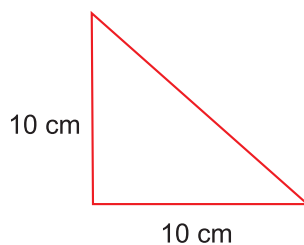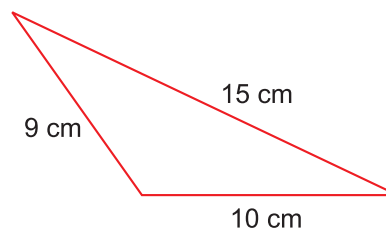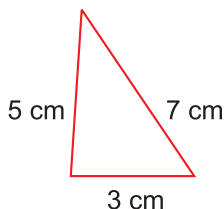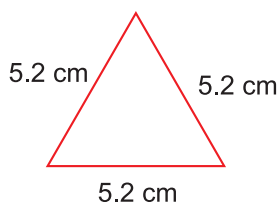
EXERCISE 5.2

1. (a) $\dfrac{1}{2}$ or two right angles.

(b) $\dfrac{1}{4}$ or one right angle

(c) $\dfrac{1}{4}$ or one right angle

(d) $\dfrac{3}{4}$ or three right angles

(e) $\dfrac{3}{4}$ or three right angles

(f) $\dfrac{3}{4}$ or three right angles

2. (a) At 6

(b) At 8

(c) At 8

(d) At 2

3. (a) West

(b) West

(c) North

(d) South

4. (a) $\dfrac{3}{4}$ or 3 right angles

(b) $\dfrac{3}{4}$ or three right angles

(c) $\dfrac{1}{2}$ or two right angles

5. (a) One right angle   (b) Two right angle
    (c) Two right angle   (d) One right angle
    (e) Three right angle   (f) Two right angle

6. (a) One right angle   (b) Three right angles
    (c) Four right angles   (d) Two right angles

7. (a) At 9   (b) At 2
    (c) At 7   (d) At 7

EXERCISE 5.3

1. (i)   (c)   (ii)   (d)
    (iii) (a)   (iv) (e)
    (v)   (b)

2. (a) Acute angle   (b) Obtuse angle
    (c) Right angle   (d) Reflex angle
    (e) Straight angle   (f) Acute angle

EXERCISE 5.4

1. (i) $90°$ (ii) $180°$

2. (a) True   (b) False
    (c) True   (d) True
    (e) True

3. (a) $35°$ and $50°$ (b) $110°$ and $135°$

4. (a) $45°$ (b) $120°$
    (c) $90°$ (d) $60°, 135°, 90°$

5. ∠B has larger measure
    ∠A = $40°$
    ∠B = $66°$

6. Second angle has larger measure

7. (a) Acute angle   (b) Obtuse angle
    (c) Straight angle   (d) Acute angle
    (e) Obtuse angle

8. (a) $40°$ (b) $130°$
    (c) $65°$ (d) $135°$

9. $90°, 30°, 180°$

10. No, the measure of angle will be same.

11. ∠AOB = $40°$ - Acute
     ∠AOC = $125°$ - Obtuse
     ∠BOC = $85°$ - Aute
     ∠DOC = $95°$ - Obtuse
     ∠DOA = $140°$ - Obtuse
     ∠DOB = 180 - Straight.

EXERCISE 5.5

1. (a) Perprndicular
   (c) Perpendicular

   (b) Not perpendicular
   (d) Not perpendicular

2.
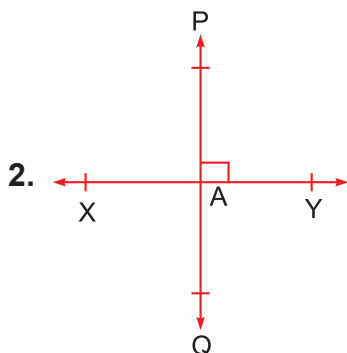
∠PAY = 90°

3. One set-square has 45°, 90°, 45° and other set square has 60°, 90°, 30°. They have 90° as common angle.

4. (a) Yes, CE = EG, both measure 2 units
   (c) $\overline{DF}$ and $\overline{CG}$

   (b) Yes, because CE = EG
   (d) (i) True
       (ii) True
       (iii) True

EXERCISE 5.6

1. (a) Scalene Triangle
   (c) Equilateral triangle
   (e) Isosceles right-angled triangle

   (b) Scalene Triangle
   (d) Right-angled triangle
   (d) Acute angled triangle

2. (i)   (e)
   (iii) (a)
   (v)   (d)
   (vii) (b)

   (ii) (g)
   (iv) (f)
   (vi) (c)

3. (a) Acute angled triangle and Isosceles triangle
   (b) Right angled triangle and scalene triangle
   (c) Obtuse angled triangle and Isosceles triangle
   (d) Right angled triangle and Isosceles triangle
   (e) Equilateral triangle and acute angled triangle
   (f) Obtuse angled triangle and scalene triangle.

4. (a) 3 matchsticks
      This is an acute angle triangle and it is possible with 3 matchsticks to make a △ because sum of two sides is greater than third side.
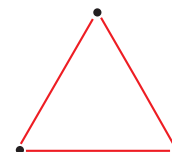
   (b) 4 matchsticks
      This is a square, hence with four matchsticks we cannot make triangle
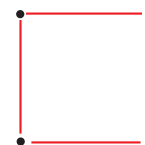
(c) 5 matchsticks

This is an acute angle triangle and its is possible to make triangle with 5 matchsticks, in this case sum of two sides is greater thant hird side.
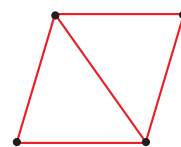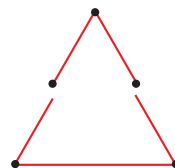
(d) 6 matchsticks

This is an acute angle triangle anf it is possible to make a triangle with the help of 6 matchsticks because sum of two sides is greater than third side.
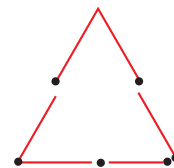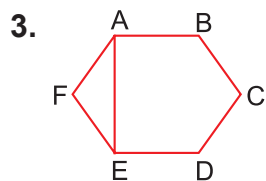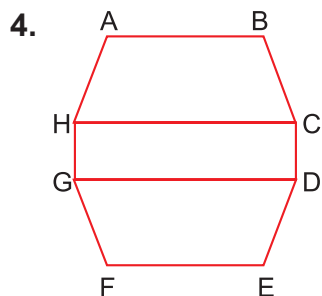
EXERCISE 5.7

1. (a) True   (b) True
   (c) True   (d) True
   (e) False   (f) False
2. (a) Because its all angle are right angle and opposite side are equal
   (b) Because its opposite sides are equal and parallel.
   (c) Because its four side are equal and diagonals are perpendicular to each other.
   (d) Because all of them have four sides.
   (e) Because its opposite sides are equal and parallel.
3. A square is a regular quadrilateral

EXERCISE 5.8

1. (a) As it is not a closed fig. therfore, it not a polygon.
   (b) It is a polygon because it is a closed by line segment.
   (c) It is not a polygon because it is not made by line segments.
   (d) It is not a polygon because it is not made only by line segments.
2. (a) Quadrilateral
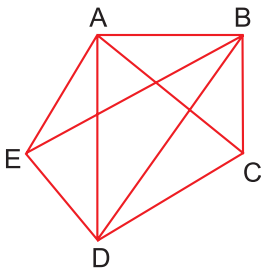   (b) Triangle
   (c) Pentagon
   (d) Octagon
3.

ABCDEF is a regular hexagon and triangle thus formed by joing AEF is an isosceles $\triangle$.

4.

ABCDEF is a regular octagon and CDG is a rectangle.

**5.** ABCDE is the required pentagon and its diagonal are AD, AC, BE and BD.

EXERCISE 5.9

1. (a) (ii)   (b) (iv)   (c) (v)   (d) (iii)   (e) (i)
2. (a) Cuboid   (b) Cuboid   (c) Cuboid   (d) Cylinder   (e) Sphere

SUBJECT ENRICHMENT EXERCISE

I.

1. 5   2. Straight a1'ngle   3. Zero angle   4. An Acute angle
5. An equilateral triangle   6. Perpendicular   7. Obtuse angle   8. 90°
9. Rectangle   10. Square   11. 5 faces

II. (a) Acute   (b) Obtuse angle and right angles   (c) 180°
(d) less   (e) Greater   (f) One point   (g) Parallel lines
(h) Different   (i) Same   (j) Concurrent lines

III. (a) True   (b) True   (c) True   (d) False
(e) False
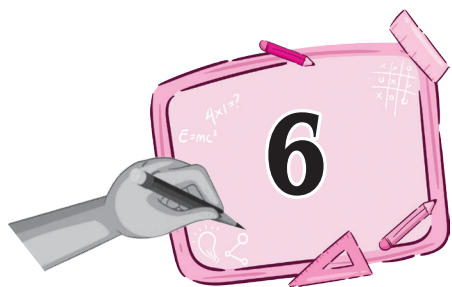
6 Integers

EXERCISE-6.1

1. (a) − 40 (b) + 105 (c) − 62
(d) + 30 (e) − 30 (f) − 40
(g) + 20 (h) + 19 (i) + 39
(j) − 82 (k) + 1000 (l) − 125
(m) + 30 (n) − 20

2. (a) 0 > (− 4) (b) (− 5) < 2 (c) (− 8) < (− 6)
(d) 0 < 4 (e) 1 > 0 (f) (− 9) = (− 9)

3. (a) − 4, − 1, 2 (b) same above (c) − 50, − 30, 0, 10

4. Do yourself

5. (a) − 2, − 1 are the integers lies between − 3 and 0
(b) The integers between − 8 and − 2 are − 7, − 6, − 5, − 4 and − 3
(c) The integers between − 4 and 4 are − 3, − 2, − 1, 0, 1, 2, 3
(d) The integers between 4 and 8 are 5, 6, 7
(e) The integers between 0 and 4 are 1, 2, 3
(f) The integers between − 6 and 3 are − 5, − 4, − 3, − 2, − 1, 0, 1, 2

6. (a) − 3 is greater (b) − 8 is greater (c) 0 is greater

7. (a) Arrange in ascending order
(− 10) < (− 7) < (− 6) < 0 < 3 < 4
(b) − 8 < − 3 < 0 < 1 < 3 < 6

8. (a) The next three integers are − 9, − 12, − 15
(b) The next three integers are 16, 24, 32
(c) The next three integers are − 3, − 8, − 13

9. (a) − 10 < − 8 < 7, < 9 (b) − 3 < − 2 < 0 < 4 (c) − 5 < − 4 < 4 < 5

10. (a) |− 60| = 60 (b) |38| = 38 (c) |− 35| = 35
(d) |105| = 105 (e) |− 3| = 3

11. (a) − 18 = 18 (b) − 105 = 105 (c) + 72 = − 72
(d) − 2 = 2 (e)− 16 = 16

EXERCISE-6.2

1. (a) (− 3) + (− 5)
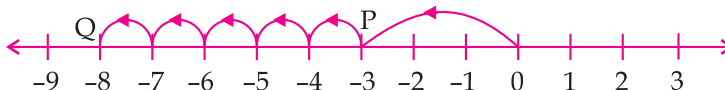
Thus, (– 3) + (– 5) = – 8

(b)
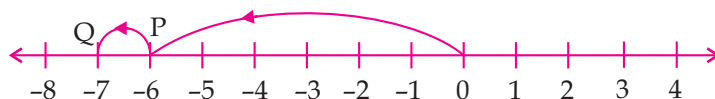
Thus, (– 6) + (– 1) = – 7

(c) (– 4) + (– 7)
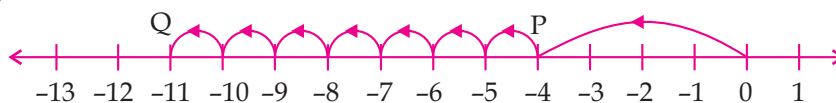
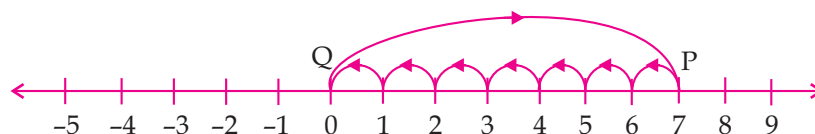

Thus, (– 4) + (– 7) = – 11

(d) 1 + (– 8)
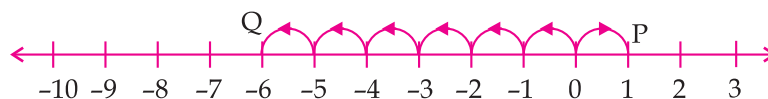
Thus, 1 + (– 8) = – 7

(e) 8 + (– 3)
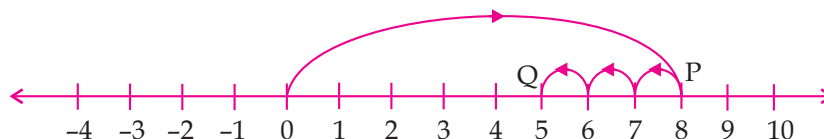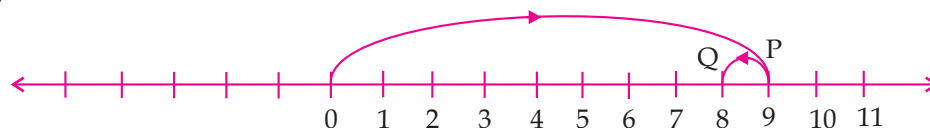

Thus, 8 + (– 3) = 5

(f) (7) + (– 7)

Thus, 7 + (– 7) = 0

(g) 9 + (– 1)

Thus, 9 + (– 1) = + 8

(h) 5 + (– 2)
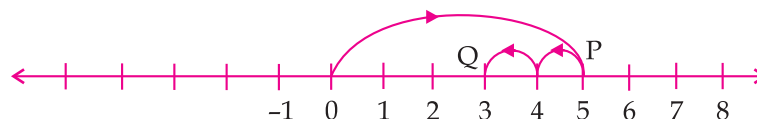
Thus, 5 + (– 2) = 3

2. (a) (– 5) + (– 7) = – 12   (b) (– 4) + (– 2) = – 6
   (c) – 7 + 3 = – 4   (d) (– 8) + (– 9) = – 17
   (e) (– 2) + (– 2) = – 4   (f) 7 + 6 = 13
   (g) (– 8) + 2 = – 6   (h) 9 + (– 7) = 2

3. (a) 7 + (– 3)
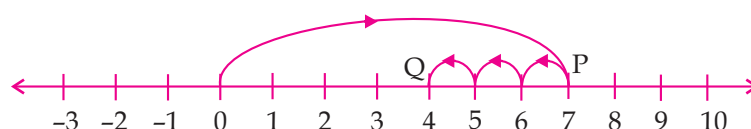
Thus, 7 + (− 3) = 4

(b) 1 − (+ 2)

Thus, 1 − (+ 2) = − 1

(c) 12 + (− 4)
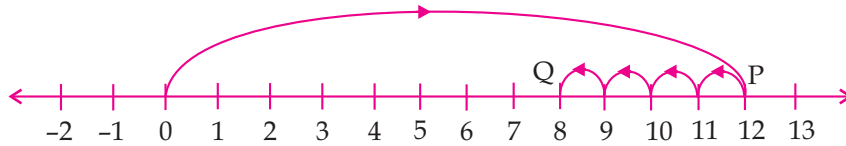
Thus, 12 + (− 4) = 8

(d) 4 + (− 7)
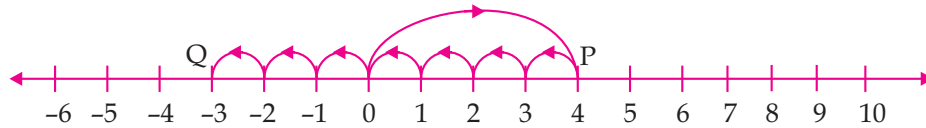
Thus, 4 + (− 7) = − 3

(e) 1 + (− 6)
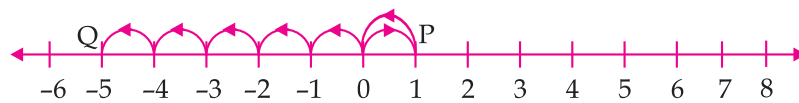
Thus, 1 + (− 6) = − 5

(f) 7 + (+ 5)
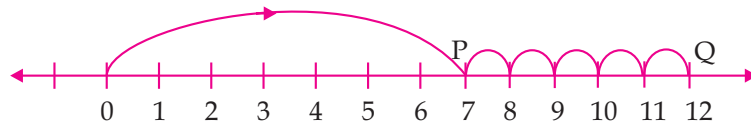
Thus, 7 + 5 = 12

(g) (− 4) − (− 2)
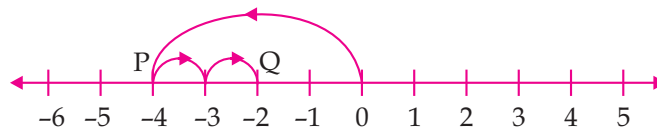
Thus, − 4 − (− 2) = − 2

(h) (− 7) + 5
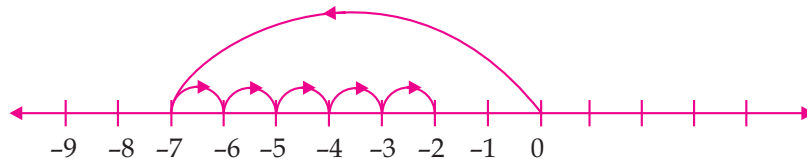
Thus, (− 7) + 5 = − 2

4. (a) (− 30) + (+ 40) = (− 30) + 40 = 10   (b) (+ 10) + (− 12) = 10 + (− 12) = − 2

     (c) (+ 7) + (− 15) = 7 + (− 15) = − 8   (d) (− 6) + (− 4) = (− 6) + (− 4) = − 10

5. (a) 343 + 356 + (− 343)

     = 343 + 356 + (− 343) = 699 + (− 343) = 356 **Ans.**

     (b) − 726 + 789 + 729 + (− 236)

     = 789 + 729 + (− 236) + (− 726)

     = 1518 + (− 962) = 556 **Ans.**

(c) 693 + (– 693)

= 693 + (– 693) = 0 **Ans.**

(d) 835 + (– 336) + (– 264)

= 835 + (– 600) = 235 **Ans.**

(e) 2 + (– 575) + (– 575) = (– 575) + (– 575) + 2300

= 2300 + 2 + (– 575) + (– 575) + (– 575) + (– 575)

= 2302 + (– 2300) = 2 **Ans.**

6. (a) (+ 8) > (+ 4)   (b) (9) < (+ 11)   (c) (+ 16) > (+ 11)   (d) (+ 10) > (– 4)

(e) (+ 13) > (– 16)   (f) (+ 8) > (– 21)   (g) (– 4) < (+ 4)   (h) (– 9) < (+ 3)

7. [80 – (– 70)] + (– 140) = 150 + (– 140) = 10

8. (– 68 + 40) + [15 – (– 6)] = (– 28) + 21 = – 7

9. The height of a light house from sea level = 60 m

The depth of a sea bed from sea level = 300 m

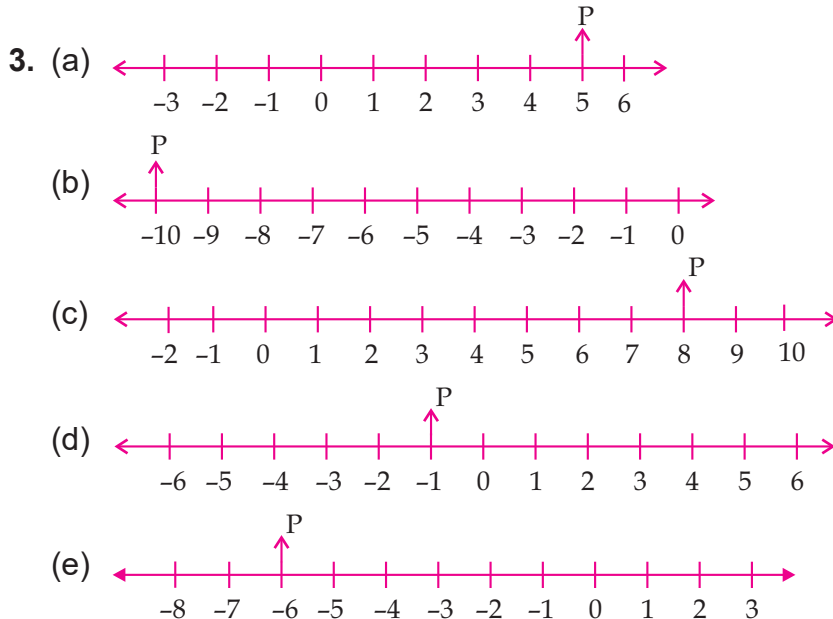The total height of the lighthouse from the sea bed = 60 + 30 = 90 m

EXERCISE-6.3

1. (a) – (– 6) = 6   (b) – (– 103) = 103   (c) – (– 5) = 5   (d) – (– 83) = 83

2. (a) 8 – (– 3)   (b) 11 – (– 2)

= 8 + (additive inverse of – 3)   = 11 + (additive inverse of – 2)

8 + 3 = 11   = 11 + 2 = 13

(c) 8 – (– 8)   (d) 12 – (– 7)

= 8 + 8 = 16   = 12 + 7 = 19

(e) (– 8) – (– 2)   (f) (– 7) – (– 9)

= – 8 + 2 = – 6   = – 7 + (9) = 2

3. (a) – 3 + 3 = 0   (b) 17 – 8 = 9

(c) 0 – (– 14) = 0 + 14 = 14   (d) (– 3) – (– 8 + 9) = – 3 – (1)

= (– 3) + (– 1) = – 4

(e) (– 1) – (– 13) = (– 1) + 13 = 12   (f) 5 – (– 1 – 8) = 5 – (– 9) = 5 + 9 = 14

4. (a) 25 from – 40   (b) – 73 from – 73

= – 40 – (25) = – 40 + (– 25) = – 65   = – 73 – (– 73) = – 73 + 73 = 0

(c) – 615 from 860   (d) 0 from (– 50)

= 860 – (– 615) = 860 + 615 = 1475   = – 50 – 0 = – 50

(e) – 85 from 0   (f) – 185 from 0

= 0 – (– 85) = 0 + 85) = 85   = 0 – (– 185) = 0 + 185 = 185

5. (a) – 8 – (+ 4)   (b) (– 13) – (+ 15)

= (– 8) + (– 4) = – 12   = (– 13) + (– 15) = – 28

(c) (– 14) – (– 6)   (d) (– 7) – (– 7)

= (– 14) + 6 = – 8   = – 7 + 7 = 0

(e) (–8) – (–9) – 8 + 9 = 1   (f) – 6 – (+ 4) = – 6 + (– 4) = – 10

6. Sum of 28 and – 12

28 + (– 12) = 16

Difference 16 from 50

50 – 16 = 34 **Ans.**

NCERT CORNER

EXERCISE-6.1

1. (a) Decrease in weight   (b) 30 km south   (c) 80 m west

    (d) Profit of ₹ 700   (e) 100 m below sea level

2. (a) + 2000 m   (b) − 800 m   (c) + 200 Rupees

    (d) − 700 Rupees

3. (a)

P at 5

−3 −2 −1 0 1 2 3 4 5 6

(b)

P at −10

−10 −9 −8 −7 −6 −5 −4 −3 −2 −1 0

(c)

P at 8

−2 −1 0 1 2 3 4 5 6 7 8 9 10

(d)

P at −1

−6 −5 −4 −3 −2 −1 0 1 2 3 4 5 6

(e)

P at −6

−8 −7 −6 −5 −4 −3 −2 −1 0 1 2 3

4. (a) F   (b) Negative   (c) B = 4 ; E = − 10

    (d) E   (e) D, C, B, A, O, H, G, F, E

5. (a) Siachin → − 10° c

    Shimla → − 2° c

    Ahmedabad → + 30° c

    Delhi → + 20° c

    Srinagar → − 5° c

    (b) Do yourself

    (c) Siachin

    (d) Ahmedabad, Delhi

6. (a) 9 is right to 2   (b) − 3 is right to − 8

    (c) 0 is right to − 1   (d) 10 is right to − 11

    (e) 6 is right to − 6   (f) 1 is right to − 100

7. (a) − 6, − 5, − 4, − 3, − 2, − 1   (b) − 3, − 2, − 1, 0 , 1, 2, 3

    (c) − 14, − 13, − 12, - 11, − 10, − 9   (d) − 29, − 28, − 27, − 26, − 25, − 24

8. (a) − 19, − 18, − 17, − 16   (b) − 11, − 12, − 13, − 14

9. (a) True   (b) False

    (c) False   (d) False

10. (a)

P at 2

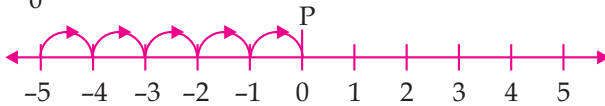−5 −4 −3 −2 −1 0 1 2 3 4

(b)

(c) On left side

(d) On right side
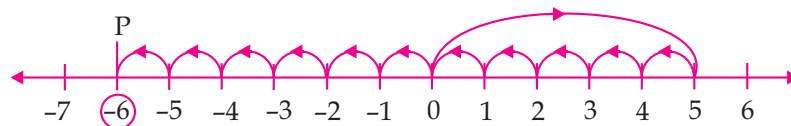
EXERCISE-6.2

1. (a) 8

(b) 0

(c) −4
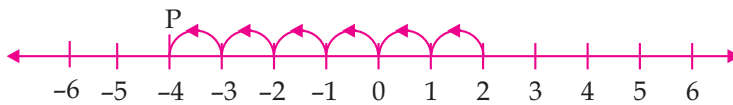
(d) −5

2. (a) 9 + (− 6) = 3
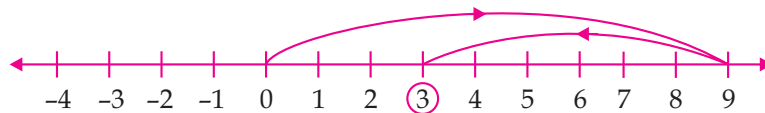
(b) 5 + (− 11) = − 6

(c) − 1 + (− 7) = − 8

(d) (− 5) + 10 = 5

(e) (− 1) + (− 2) + (− 3) = − 6

(f) (− 2) + 8 + (− 4) = 2

Mathematics-6
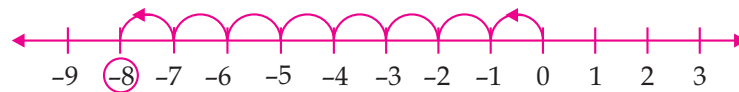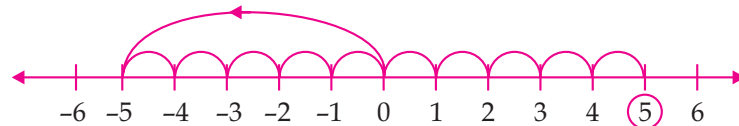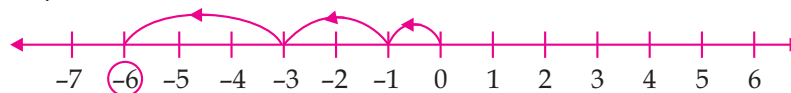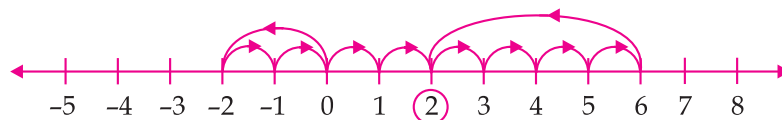
3. (a) 11 + (– 7) = 11 – 7 = 4   (b) (– 13) + (18) = 5

(c) (– 10) + (19) = 9   (d) (– 250) + (150) = – 100

(e) (– 380) + (– 270) = – 380 – 270 = – 650   (f) (– 217) + (– 100) = – 217 – 100 = – 317

4. (a) 137 and – 354   (b) (– 52) + 52 = 0

       = 137 + (– 354)

       = 137 – 354 = – 217

(c) (– 312) + 39 + 192   (d) (– 50) + (– 200) + 300

       = – 312 + 231 = – 81   = – 250 + 300 = 50

5. (a) (– 7) + (– 9) + 4 + 16   (b) (37) + (– 2) + (– 65) + (– 8)

       = – 7 – 9 + 4 + 16 = – 16 + 20 = 4   = 37 – 2 – 65 – 8 = 37 – 75 = – 38

EXERCISE-6.3

1. (a) 35 – 20 = 15   (b) 72 – (90) = 72 – 90 = – 18

(c) (– 15) – (– 18) = – 15 + 18 = 3   (d) (– 20) – (– 13) = – 20 – 13 = – 33

(e) 23 – (– 12) = 23 + 12 = 35   (f) (– 32) – (– 40) = – 32 + 40 + 8

2. (a) (– 3) + (– 6) < (– 3) – (– 6)   (b) (– 21) – (– 10) > (– 31) + (– 11)

(c) 45 – (– 11) >: 57 + (– 4)   (d) (– 25) – (– 42) > (– 42) – (– 25)

3. (a) (– 8) + <u>8</u> = 0   (b) 13 + (– 13) = 0

(c) 12 + (– 12) = <u>0</u>   (d) (– 4) + (– 8) = – 12

(e) <u>5</u> – 15 = – 10

4. (a) (– 7) – 8 – (– 25)   (b) (– 13) + 32 – 8 – 1

       = – 7 – 8 + 25   = – 13 + 32 – 8 – 1

       = – 15 + 25 = 10   = – 13 – 8 – 1 + 32 = – 22 + 32 = 10

(c) (– 7) + (– 8) + (– 90)   (d) 50 – (– 40) – (– 2)

       = – 7 – 8 – 90   = 50 + 40 + 2

       = – 105   = 92

SUBJECT ENRICHMENT EXERCISE

I. (1) 0   (2) 150 m

(3) the left   (4) 4

(5) – 396   (6) 3

(7) both I and II are true   (8) 7

II. (1) – 2 km   (2) True

(3) – 2, – 1, 0, 1, 2, 3, 4, 5, 6, 7   (4) – 99

(5) 10

(6) – 5, – 6, – 7, – 8, – 9, – 10, – 11, – 12, – 13, – 14

(7) 16 ; – 14   (8) Integers

(9) – 14, – 13, – 12, – 11, – 10

III. (1) True   (2) True

(3) True   (4) False

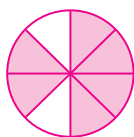(5) True
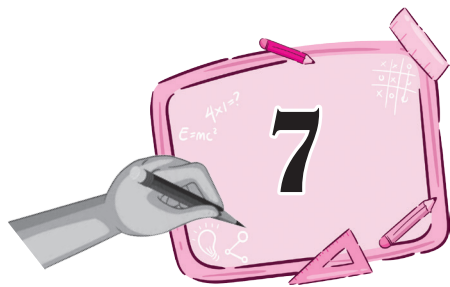
7 Fractions

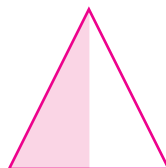**1.** (a) $\dfrac{1}{2}$ (b) $\dfrac{3}{4}$ (c) $\dfrac{5}{25} = \dfrac{1}{5}$ (d) $\dfrac{3}{8}$
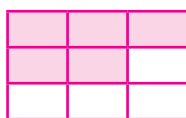
2. (a) $\dfrac{4}{6}$ (b) $\dfrac{1}{2}$

(c) $\dfrac{5}{9}$ (d) $\dfrac{3}{8}$

3. (a) $\dfrac{5}{8}$ (b) $\dfrac{4}{10}$

4. 1 kg = 100 gm
let the fraction = x
x of 1000 gm = 550 gm
x × 1000 gm = 550 gm

$x = \dfrac{550}{1000} = \dfrac{11}{20}$

5. 1 day = 24 hrs
x of 24 hrs = 6
x × 24 = 6

$x = \dfrac{6}{24}$

$x = \dfrac{1}{4}$

6. Natural Numbers from 2 to 15
Natural Numbers = 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
Even Natural = 4, 6, 8, 10, 12, 14

$\dfrac{6}{12} = \dfrac{1}{2}$

7. Kamal has toffees = 66

He gives to Kavi = $66 \times \dfrac{5}{11}$

$= \dfrac{5}{11} \times 66 = 30$ toffees

∴ 30 toffees to get Kavi and (66 − 30) = 36 toffees are left with Kamal

8. (a) $7\dfrac{4}{3}$

$= \dfrac{7 \times 3 + 4}{3} = \dfrac{21 + 4}{3} = \dfrac{25}{3}$

(b) $11\dfrac{3}{9}$

$= \dfrac{11 \times 9 + 3}{9} = \dfrac{99 + 3}{9} = \dfrac{102}{9}$

(c) $7\dfrac{6}{9} = \dfrac{7 \times 9 + 6}{9} = \dfrac{63 + 6}{9} = \dfrac{69}{9}$

(d) $13\dfrac{7}{12} = \dfrac{13 \times 12 + 7}{12} = \dfrac{163}{12}$

9. (a) $\dfrac{43}{8} = 5\dfrac{3}{8}$

$$8\overline{)43}(5$$
$$\underline{-40}$$
$$3$$

(b) $\dfrac{38}{6} = 6\dfrac{2}{6}$

$$6\overline{)38}(6$$
$$\underline{-36}$$
$$2$$

(c) $\dfrac{15}{11} = 1\dfrac{4}{11}$

$$11\overline{)15}(1$$
$$\underline{-11}$$
$$4$$

(d) $\dfrac{27}{2} = 13\dfrac{1}{2}$

$$2\overline{)27}(13$$
$$\underline{-2}$$
$$07$$
$$\underline{-6}$$
$$1$$

EXERCISE-7.2

1. (a) $\dfrac{2}{7} = \dfrac{8}{\boxed{28}}$

$\dfrac{2 \times 4}{7 \times 4} = \dfrac{8}{28}$

(b) $\dfrac{7}{9} = \dfrac{\boxed{49}}{63}$

$\dfrac{7 \times 7}{9 \times 7} = \dfrac{49}{63}$

(c) $\dfrac{\boxed{3}}{5} = \dfrac{15}{25}$

$\dfrac{15 \div 5}{25 \div 5} = \dfrac{3}{5}$

(d) $\dfrac{11}{15} = \dfrac{\boxed{99}}{135}$

$\dfrac{11 \times 9}{15 \times 9} = \dfrac{99}{135}$

2. (a) Numerator = 16

$\dfrac{4 \times 4}{9 \times 4} = \dfrac{16}{36}$

$\therefore \ \dfrac{4}{9} = \dfrac{16}{36}$

(b) Denominator = 81

$\dfrac{4 \times 9}{9 \times 9} = \dfrac{36}{81}$

Hence, the required equivalent fraction $= \dfrac{36}{81}$

3. (a) Numerator = 20

$\dfrac{4 \times 5}{7 \times 5} = \dfrac{20}{35}$

Hence, the required equivalent fraction $= \dfrac{20}{35}$

(b) Denominator = 28

$$\frac{4 \times 4}{7 \times 4} = \frac{16}{28}$$

Hence, the required equivalent fraction = $\frac{16}{28}$

4. (a) $\frac{2}{3}$

$$\frac{2}{3} = \frac{2 \times 2}{3 \times 2} = \frac{2 \times 3}{3 \times 3} = \frac{2 \times 4}{3 \times 4} = \frac{2 \times 5}{3 \times 5}$$

$$\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15}$$

$\therefore \frac{4}{6}, \frac{6}{9}, \frac{8}{12}, \frac{10}{15}$ are four equivalent fraction of $\frac{2}{3}$.

(b) $\frac{4}{5}$

$$\frac{4}{5} = \frac{4 \times 2}{5 \times 2} = \frac{4 \times 3}{5 \times 3} = \frac{4 \times 4}{5 \times 4} = \frac{4 \times 5}{5 \times 5}$$

$$= \frac{8}{10} = \frac{12}{15} = \frac{16}{20} = \frac{20}{25}$$

$\therefore \frac{8}{10} = \frac{12}{15} = \frac{16}{20} = \frac{20}{25}$ are four equivalent fractions of $\frac{4}{5}$.

(c) $\frac{9}{2} = \frac{18}{4} = \frac{27}{6} = \frac{36}{8} = \frac{45}{10}$

(d) $\frac{8}{11} = \frac{16}{22} = \frac{24}{33} = \frac{32}{44} = \frac{40}{55}$

5. (a) $\frac{10}{12} = \frac{5}{6}$ (b) $\frac{112}{144} = \frac{7}{9}$ (c) $\frac{108}{144} = \frac{3}{4}$ (d) $\frac{42}{28} = \frac{3}{2}$

EXERCISE-7.3

1. (a) $\frac{1}{6} \boxed{<} \frac{5}{6}$ (b) $\frac{4}{7} \boxed{<} \frac{6}{7}$ (c) $\frac{1}{7} \boxed{<} \frac{3}{7}$ (d) $\frac{2}{11} \boxed{<} \frac{5}{11}$

(e) $\frac{7}{23} \boxed{<} \frac{20}{23}$ (f) $\frac{5}{21} \boxed{>} \frac{3}{21}$

2. (a) $\frac{4}{5} \boxed{>} \frac{5}{7}$ (b) $\frac{3}{8} \boxed{<} \frac{5}{6}$ (c) $\frac{7}{11} \boxed{<} \frac{6}{7}$ (d) $\frac{5}{6} \boxed{>} \frac{9}{11}$

(e) $\frac{2}{3} \boxed{>} \frac{4}{9}$ (f) $\frac{6}{13} \boxed{<} \frac{3}{4}$

3. (a) $\frac{4}{16} = \frac{9}{\boxed{36}}$ (b) $\frac{5}{6} = \frac{\boxed{15}}{18}$ (c) $\frac{4}{28} = \frac{2}{\boxed{14}}$ (d) $\frac{7}{14} = \frac{2}{\boxed{3}}$

(e) $\frac{6}{2} = \frac{9}{\boxed{3}}$ (f) $\frac{75}{25} = \frac{\boxed{15}}{5}$ (g) $\frac{100}{300} = \frac{2}{\boxed{6}}$ (h) $\frac{16}{20} = \frac{\boxed{4}}{5}$

4. (a) $\dfrac{1}{2}, \dfrac{13}{4}, \dfrac{5}{6}, \dfrac{7}{8}$

These fractions are unlike fraction. So, first they make a like fraction.

L.C.M of 2, 4, 6 and 8 = 24

$$\dfrac{1 \times 12}{2 \times 12} = \dfrac{12}{24} \quad , \quad \dfrac{5 \times 4}{6 \times 4} = \dfrac{20}{24}$$

$$\dfrac{13 \times 6}{4 \times 6} = \dfrac{78}{24} \quad , \quad \dfrac{7 \times 3}{8 \times 3} = \dfrac{21}{24}$$

Arrange in ascending order.

$$\dfrac{12}{24} < \dfrac{20}{24} < \dfrac{21}{24} < \dfrac{78}{24}$$

$$\therefore \dfrac{1}{2} < \dfrac{5}{6} < \dfrac{7}{8} < \dfrac{13}{4}$$

(b) $\dfrac{2}{3}, \dfrac{7}{10}, \dfrac{1}{15}$ and $\dfrac{17}{30}$

L.C.M of 3, 10, 15 and 30 = 30

$$\dfrac{2 \times 10}{3 \times 10} = \dfrac{20}{30} \quad , \quad \dfrac{7 \times 3}{10 \times 3} = \dfrac{21}{30}$$

$$\dfrac{1 \times 2}{15 \times 2} = \dfrac{2}{30} \quad , \quad \dfrac{17 \times 1}{30 \times 1} = \dfrac{17}{30}$$

Arrange in ascending order

$$\dfrac{2}{30} < \dfrac{17}{30} < \dfrac{20}{30} < \dfrac{21}{30}$$

$$\therefore \dfrac{1}{15} < \dfrac{17}{30} < \dfrac{2}{3} < \dfrac{7}{10}$$

(c) $\dfrac{2}{7}, \dfrac{7}{10}, \dfrac{11}{15}$ and $\dfrac{11}{30}$

L.C.M of 7, 10, 15 and 30 = 210

$$\dfrac{2 \times 30}{7 \times 30} = \dfrac{60}{210} \quad , \quad \dfrac{7 \times 21}{10 \times 21} = \dfrac{147}{210}$$

$$\dfrac{11 \times 14}{15 \times 14} = \dfrac{154}{210} \quad , \quad \dfrac{11 \times 7}{30 \times 7} = \dfrac{77}{210}$$

Arrange in ascending order

$$\dfrac{60}{210} < \dfrac{77}{210} < \dfrac{147}{210} < \dfrac{154}{210}$$

$$\therefore \dfrac{2}{7} < \dfrac{11}{30} < \dfrac{7}{10} < \dfrac{11}{15}$$

(d) $\dfrac{2}{7}, \dfrac{13}{25}, \dfrac{11}{14}, \dfrac{15}{28}$

L.C.M of 7, 25, 14 and 28 = 700

$$\dfrac{2 \times 100}{7 \times 100} = \dfrac{200}{700}, \qquad \dfrac{13 \times 28}{25 \times 28} = \dfrac{364}{700}$$

$$\dfrac{11 \times 50}{14 \times 50} = \dfrac{550}{700}, \qquad \dfrac{15 \times 25}{25 \times 25} = \dfrac{375}{700}$$

Arrange in ascending order

$$\dfrac{200}{700} < \dfrac{364}{700} < \dfrac{375}{700} < \dfrac{550}{700}$$

$$\therefore \dfrac{2}{7} < \dfrac{13}{25} < \dfrac{15}{28} < \dfrac{11}{14}$$

5. (a) $\dfrac{3}{4}, \dfrac{5}{8}, \dfrac{11}{12}, \dfrac{17}{24}$

L.C.M of 4, 8, 12 and 24 = 24

$$\dfrac{3 \times 6}{4 \times 6} = \dfrac{18}{24}, \qquad \dfrac{5 \times 3}{8 \times 3} = \dfrac{15}{24}$$

$$\dfrac{11 \times 2}{12 \times 2} = \dfrac{22}{24}, \qquad \dfrac{17 \times 1}{24 \times 1} = \dfrac{17}{24}$$

Arrange in descending order

$$\dfrac{22}{24} > \dfrac{18}{24} > \dfrac{17}{24} > \dfrac{15}{24}$$

$$\therefore \dfrac{11}{12} > \dfrac{3}{4} > \dfrac{17}{24} > \dfrac{5}{8}$$

(b) $\dfrac{3}{8}, \dfrac{5}{6}, \dfrac{2}{4}, \dfrac{1}{3}, \dfrac{6}{8}$

L.C.M of 8, 6, 4, 3 = 24

$$\dfrac{3 \times 3}{8 \times 3} = \dfrac{9}{24}, \qquad \dfrac{5 \times 4}{6 \times 4} = \dfrac{20}{24}, \qquad \dfrac{2 \times 6}{4 \times 6} = \dfrac{12}{24}$$

$$\dfrac{1 \times 8}{3 \times 8} = \dfrac{8}{24}, \dfrac{6 \times 3}{8 \times 3} = \dfrac{18}{24}$$

Arrange in descending order

$$\dfrac{20}{24} > \dfrac{18}{24} > \dfrac{12}{24} > \dfrac{9}{24} > \dfrac{8}{24}$$

$$\therefore \dfrac{5}{6} > \dfrac{6}{8} > \dfrac{2}{4} > \dfrac{3}{8} > \dfrac{1}{3}$$

(c) $\dfrac{5}{9}, \dfrac{9}{14}, \dfrac{7}{21}, \dfrac{11}{42}$

L.C.M of 9, 14, 21, 42 = 126

$\dfrac{5 \times 14}{9 \times 14} = \dfrac{70}{126}$, $\dfrac{9 \times 9}{14 \times 9} = \dfrac{81}{126}$

$\dfrac{7 \times 6}{21 \times 6} = \dfrac{42}{126}$, $\dfrac{11 \times 3}{42 \times 3} = \dfrac{33}{126}$

Arrange in descending order

$\dfrac{81}{126} > \dfrac{70}{126} > \dfrac{42}{126} > \dfrac{33}{126}$

$\therefore \dfrac{9}{14} > \dfrac{5}{9} > \dfrac{7}{21} > \dfrac{11}{42}$

(d) $\dfrac{5}{9}, \dfrac{3}{12}, \dfrac{1}{3}, \dfrac{4}{15}$

L.C.M of 9, 12, 3 and 15 = 180

$\dfrac{5 \times 20}{9 \times 20} = \dfrac{100}{180}$, $\dfrac{3 \times 15}{12 \times 15} = \dfrac{45}{180}$

$\dfrac{1 \times 60}{3 \times 60} = \dfrac{60}{180}$, $\dfrac{4 \times 12}{15 \times 12} = \dfrac{48}{180}$

Arrange in descending order

$\dfrac{100}{180} > \dfrac{60}{180} > \dfrac{48}{180} > \dfrac{45}{180}$

$\therefore \dfrac{5}{9} > \dfrac{1}{3} > \dfrac{4}{15} > \dfrac{3}{12}$

EXERCISE-7.4

1. (a) $\dfrac{3}{4} + \dfrac{5}{12} + \dfrac{2}{3}$

L.C.M of 4, 3 and 12 = 12

$\dfrac{3 \times 3}{4 \times 3} = \dfrac{9}{12}$, $\dfrac{5 \times 1}{12 \times 1} = \dfrac{5}{12}$, $\dfrac{2 \times 4}{3 \times 4} = \dfrac{8}{12}$

$\dfrac{9}{12} + \dfrac{5}{12} + \dfrac{8}{12} = \dfrac{9 + 5 + 8}{12} = \dfrac{22}{12} = \dfrac{11}{6}$

(b) $\dfrac{1}{6} + \dfrac{2}{3}$

L.C.M of 6 and 3 = 6

$\dfrac{1}{6} + \dfrac{4}{6} = \dfrac{5}{6}$

(c) $\dfrac{1}{2} + \dfrac{5}{6} + \dfrac{7}{3}$

L.C.M of 2, 6 and 3 = 6

$\dfrac{1 \times 3}{2 \times 3} = \dfrac{3}{6}$, $\dfrac{5 \times 1}{6 \times 1} = \dfrac{5}{6}$, $\dfrac{7 \times 2}{3 \times 2} = \dfrac{14}{6}$

$\dfrac{3}{6} + \dfrac{5}{6} + \dfrac{14}{6} = \dfrac{22}{6} = \dfrac{11}{3}$

(d) $\dfrac{1}{2} + \dfrac{1}{12} = \dfrac{6 + 1}{12} = \dfrac{7}{12}$

(e) $\dfrac{6}{10} + 3\dfrac{1}{2} = \dfrac{6}{10} + \dfrac{7}{2} = \dfrac{6 + 35}{10} = \dfrac{41}{10} = 4\dfrac{1}{10}$

(f) $2\dfrac{1}{9} + 1\dfrac{1}{3} = \dfrac{19}{9} + \dfrac{4}{3} = \dfrac{19 + 12}{9} = \dfrac{31}{9} = 3\dfrac{4}{9}$

(g) $\dfrac{3}{4} + \dfrac{1}{8} = \dfrac{6 + 1}{8} = \dfrac{7}{8}$

(h) $\dfrac{1}{4} + \dfrac{3}{8} = \dfrac{2 + 3}{8} = \dfrac{5}{8}$

(i) $1\dfrac{4}{5} + 2\dfrac{7}{10} = \dfrac{9}{5} + \dfrac{27}{10} = \dfrac{18 + 27}{10} = \dfrac{45}{10} = 4\dfrac{1}{2}$

(j) $\dfrac{1}{3} + \dfrac{1}{9} + \dfrac{7}{27} = \dfrac{9 + 3 + 7}{27} = \dfrac{19}{27}$

(k) $\dfrac{5}{6} + \dfrac{7}{12} = \dfrac{10 + 7}{12} = \dfrac{17}{12} = 1\dfrac{5}{12}$

(l) $\dfrac{8}{10} + \dfrac{1}{2} = \dfrac{8 + 5}{10} = \dfrac{13}{10} = 1\dfrac{3}{10}$

(m) $\dfrac{3}{10} + \dfrac{1}{2} + \dfrac{3}{5} = \dfrac{3 + 5 + 6}{10} = \dfrac{14}{10} = 1\dfrac{2}{5}$

(n) $1\dfrac{5}{8} + \dfrac{1}{8} = \dfrac{13}{8} + \dfrac{1}{8} = \dfrac{13 + 1}{8} = \dfrac{14}{8} = 1\dfrac{6}{8} = 1\dfrac{3}{4}$

(o) $\dfrac{7}{12} + \dfrac{1}{3} = \dfrac{7 + 4}{12} + \dfrac{11}{12}$

(p) $\dfrac{5}{6} + \dfrac{11}{18} = \dfrac{15 + 11}{18} = \dfrac{26}{18} = 1\dfrac{4}{9}$

2. (a) $\dfrac{3}{8} - \dfrac{1}{8} = \dfrac{3 - 1}{8} = \dfrac{2}{8} = \dfrac{1}{4}$

(b) $\dfrac{7}{12} - \dfrac{5}{12} = \dfrac{7 - 5}{12} = \dfrac{2}{12} = \dfrac{1}{6}$

(c) $4\dfrac{3}{7} - 2\dfrac{4}{7} = \dfrac{31}{7} - \dfrac{18}{7} = \dfrac{31 - 18}{7} = \dfrac{13}{7} = 1\dfrac{6}{7}$

(d) $\dfrac{5}{6} - \dfrac{4}{9} = \dfrac{15 - 8}{18} = \dfrac{7}{18}$

(e) $\dfrac{1}{2} - \dfrac{3}{8} = \dfrac{4 - 3}{8} = \dfrac{1}{8}$

(f) $\dfrac{5}{8} - \dfrac{7}{12} = \dfrac{15 - 14}{24} = \dfrac{1}{24}$

(g) $2\dfrac{7}{9} - 1\dfrac{8}{15} = \dfrac{25}{9} - \dfrac{23}{15} = \dfrac{125 - 69}{45} = \dfrac{56}{45} = 1\dfrac{11}{45}$

(h) $\dfrac{23}{7} - 1\dfrac{5}{14} = \dfrac{23}{7} - \dfrac{19}{14} = \dfrac{46 - 19}{14} = \dfrac{27}{14} = 1\dfrac{13}{14}$

(i) $2\dfrac{3}{10} - 1\dfrac{7}{15} = \dfrac{23}{10} - \dfrac{22}{15} = \dfrac{68 - 44}{30} = \dfrac{25}{30} = \dfrac{5}{6}$

(j) $6\dfrac{2}{3} - 3\dfrac{3}{4} = \dfrac{20}{3} - \dfrac{15}{4} = \dfrac{80-45}{12} = \dfrac{35}{12} = 2\dfrac{11}{12}$

(k) $7 - 5\dfrac{2}{3} = \dfrac{7}{1} - \dfrac{17}{3} = \dfrac{21-17}{3} = \dfrac{4}{3} = 1\dfrac{1}{3}$

(l) $10 - 6\dfrac{3}{8} = \dfrac{10}{1} - \dfrac{51}{8} = \dfrac{80-51}{8} = \dfrac{29}{8} = 3\dfrac{5}{8}$

3. Rahul spent time in painting his toy aeroplane = $\dfrac{1}{3}$ hr

Rahul spent time in polishing his shoes = $\dfrac{1}{6}$ hr

He spent time together = $\dfrac{1}{3} + \dfrac{1}{6} = \dfrac{2+1}{6} = \dfrac{3}{6} = \dfrac{1}{2}$ hr

$\therefore$ He spent $\dfrac{1}{2}$ hr together.

4. Quantity of water = $\dfrac{1}{2}$ l

Quantity of orange squash = $\dfrac{1}{8}$ l

Mixture of water and orange squash = $\left(\dfrac{1}{2} + \dfrac{1}{8}\right) l = \dfrac{4+1}{8} = \dfrac{5}{8}$ l

$\therefore$ She get $\dfrac{5}{8}$ l mixture.

5. Ashok worked yesterday = $\dfrac{1}{5}$ work

Ashok worked today = $\dfrac{1}{5}$ work

Complete work = 1

Remaining work = $1 - \left(\dfrac{1}{5} + \dfrac{1}{5}\right) = 1 - \dfrac{2}{5} = \dfrac{3}{5}$ work

$\therefore$ He has to do $\dfrac{3}{5}$ work tomorrow to complete the remaining work.

6. Rahul ate piece of cake = $\dfrac{2}{5} = \dfrac{4}{10}$ piece

Jai ate piece of cake = $\dfrac{3}{10}$ piece

(i) Rahul ate more cake

(ii) Rahul ate more cake than Jai = $\dfrac{4}{10} - \dfrac{3}{10} = \dfrac{1}{10}$ piece

NCERT CORNER

EXERCISE-7.1

1. (i) $\dfrac{2}{4}$ (ii) $\dfrac{8}{9}$ (iii) $\dfrac{4}{8}$ (iv) $\dfrac{1}{4}$

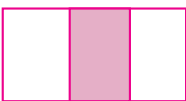(v) $\dfrac{3}{7}$ (vi) $\dfrac{3}{12}$ (vii) $\dfrac{10}{10}$ (viii) $\dfrac{4}{9}$
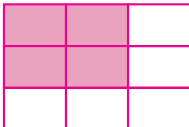
(ix) $\dfrac{4}{8}$ (x) $\dfrac{1}{2}$

2. (i) $= \dfrac{1}{6}$ (ii) $= \dfrac{1}{4}$

(iii) $= \dfrac{1}{3}$ (iv) $= \dfrac{3}{4}$

(v) $= \dfrac{4}{9}$

3. All the figure are not equally divided. For making fractions, it is necessary that figure is to be divided in equal parts.

4. 1 day = 24 hrs

$\therefore$ The fraction of 8 hrs $= \dfrac{8}{24} = \dfrac{1}{3}$

5. 1 hr = 60 minutes

$\therefore$ The fraction of 40 minutes $= \dfrac{40}{60} = \dfrac{2}{3}$

6. (a) Arya will divide each sandwich into three equal parts and give one parts of each sandwich to each one of them.

(b) $1 \times \dfrac{1}{3} = \dfrac{1}{3}$

7. Total number of dresses = 30
Work finished = 20

Fraction of finished work $= \dfrac{20}{30} = \dfrac{2}{3}$

8. Natural number from 2 to 12 = 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Prime number from 2 to 12 = 2, 3, 5, 7, 11

Hence, fraction of prime numbers $= \dfrac{5}{11}$ **Ans.**

9. Natural numbers from 102 to 113 = 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113
Prime number = 103, 107, 109, 113

Hence, fraction of prime numbers $= \dfrac{4}{12} = \dfrac{1}{3}$

10. Total number of circle = 8 and no of circle having 'x' = 4
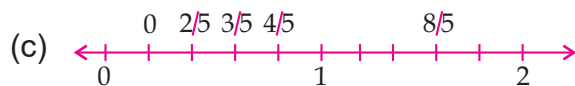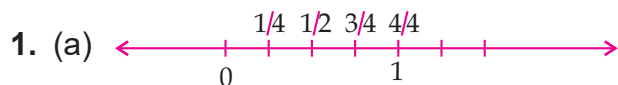
Hence, the fraction $= \dfrac{4}{8}$

11. Total number of CD's = 3 + 5 = 8

Number of CD's purchased = 3

Fraction of CD's purchased = $\dfrac{3}{8}$

Fraction of CD's received as gifts = $\dfrac{5}{8}$

EXERCISE-7.2

1. (a)

1/4 1/2 3/4 4/4

0   1

(b)

1/8 2/8 3/8   7/8

0   1

(c)

0 2/5 3/5 4/5   8/5

0   1   2

2. (a) $\dfrac{20}{3} = 6\dfrac{2}{3}$

$3\overline{)20}\,(6$
$\underline{-18}$
$\quad 2$

(b) $\dfrac{11}{5} = 2\dfrac{1}{5}$

$5\overline{)11}\,(2$
$\underline{-10}$
$\quad 1$

(c) $\dfrac{17}{7} = 2\dfrac{3}{7}$

$7\overline{)17}\,(2$
$\underline{-14}$
$\quad 3$

(d) $\dfrac{28}{5} = 5\dfrac{3}{5}$

$5\overline{)28}\,(5$
$\underline{-25}$
$\quad 3$

(e) $\dfrac{19}{6} = 3\dfrac{1}{6}$

$6\overline{)19}\,(3$
$\underline{-18}$
$\quad 1$

(f) $\dfrac{35}{9} = 3\dfrac{8}{9}$

$9\overline{)35}\,(3$
$\underline{-27}$
$\quad 8$

3. (a) $7\dfrac{3}{4} = \dfrac{(7 \times 4) + 3}{4} = \dfrac{28 + 3}{4} = \dfrac{31}{4}$

(b) $5\dfrac{6}{7} = \dfrac{35 + 6}{7} = \dfrac{41}{7}$

(c) $2\dfrac{5}{6} = \dfrac{12 + 5}{6} = \dfrac{17}{6}$

(d) $10\dfrac{3}{5} = \dfrac{50 + 3}{5} = \dfrac{53}{5}$

(e) $9\dfrac{3}{7} = \dfrac{63 + 3}{7} = \dfrac{66}{7}$

(f) $8\dfrac{4}{9} = \dfrac{72 + 4}{9} = \dfrac{76}{9}$

EXERCISE-7.3

1. (a) $\dfrac{1}{2}, \dfrac{2}{4}, \dfrac{3}{6}, \dfrac{4}{8}$

Yes, all of these fractions are equivalent

(b) $\dfrac{4}{12}, \dfrac{3}{9}, \dfrac{2}{6}, \dfrac{1}{3}, \dfrac{6}{15}$

No, these fractions are not equivalent

2. (a) $\dfrac{1}{2}$

(ii) $\dfrac{1}{2} = \dfrac{1}{2}$

(b) $\dfrac{2}{3} = \dfrac{2}{3}$

(iv) $\dfrac{2}{3} = \dfrac{2}{3}$

(c) $\dfrac{1}{3} = \dfrac{1}{3}$

(i) $\dfrac{1}{3} = \dfrac{1}{3}$

(d) $\dfrac{1}{3} = \dfrac{1}{4}$

(v) $\dfrac{1}{4} = \dfrac{1}{4}$

(e) $\dfrac{3}{4}$

(iii) $\dfrac{\overset{3}{\cancel{12}}}{\underset{4}{\cancel{16}}} = \dfrac{3}{4}$

3. (a) $\dfrac{2}{7} = \dfrac{8}{\boxed{28}}$ (b) $\dfrac{5}{8} = \dfrac{10}{\boxed{16}}$ (c) $\dfrac{3}{5} = \dfrac{\boxed{12}}{20}$ (d) $\dfrac{45}{60} = \dfrac{15}{\boxed{20}}$

(e) $\dfrac{18}{24} = \dfrac{\boxed{3}}{4}$

4. (a) $\dfrac{3}{5} = \dfrac{3 \times 4}{5 \times 4} = \dfrac{12}{20}$ (b) $\dfrac{3 \times 3}{5 \times 3} = \dfrac{9}{15}$ (c) $\dfrac{3}{5} = \dfrac{3 \times 6}{5 \times 6} = \dfrac{18}{30}$ (d) $\dfrac{3}{5} = \dfrac{3 \times 9}{5 \times 9} = \dfrac{27}{45}$

5. (a) $\dfrac{36}{48} = \dfrac{36 \div 4}{48 \div 4} = \dfrac{9}{12}$ (b) $\dfrac{36}{48} = \dfrac{36 \div 12}{48 \div 12} = \dfrac{3}{4}$

6. (a) $\dfrac{5}{9}, \dfrac{30}{54} = \dfrac{5 \times 6}{9 \times 6}, \dfrac{30}{54} = \dfrac{30}{54}, \dfrac{30}{54}$

$\therefore \dfrac{5}{9}, \dfrac{30}{54}$ are equivalent.

(b) $\dfrac{3}{10}, \dfrac{12}{50} = \dfrac{3 \times 5}{10 \times 5}, \dfrac{12}{50} = \dfrac{15}{50}, \dfrac{12}{50}$

$\therefore \dfrac{3}{10}, \dfrac{12}{50}$ are not equivalent fractions.

(c) $\dfrac{7}{13}, \dfrac{5}{11} = \dfrac{7 \times 11}{13 \times 11}, \dfrac{5 \times 13}{11 \times 13} = \dfrac{77}{143}, \dfrac{65}{143}$

$\therefore \dfrac{7}{13}, \dfrac{5}{11}$ are not equivalent fractions

7. (a) $\dfrac{\cancel{48}^{\;\cancel{24}^{\,4}}}{\cancel{60}_{\;\cancel{30}_{\,5}}} = \dfrac{4}{5}$ (b) $\dfrac{\cancel{150}^{\,5}}{\cancel{60}_{\,2}} = \dfrac{5}{2}$ (c) $\dfrac{\cancel{84}^{\;\cancel{42}^{\,6}}}{\cancel{98}_{\;\cancel{49}_{\,7}}} = \dfrac{6}{7}$ (d) $\dfrac{\cancel{12}^{\;\cancel{6}^{\,3}}}{\cancel{52}_{\;\cancel{26}_{\,13}}} = \dfrac{3}{13}$

(e) $\dfrac{\cancel{7}^{\,1}}{\cancel{28}_{\,4}} = \dfrac{1}{4}$

8. Ramesh : Total pencils = 20

Pencils used = 10

Fraction $= \dfrac{10}{20} = \dfrac{1}{2}$

Sheelu : Total pencils = 50

Pencils used = 25

Fraction $= \dfrac{25}{50} = \dfrac{1}{2}$

Jamaal : Total pencils = 50

Pencil used = 40

Fraction $= \dfrac{40}{80} = \dfrac{1}{2}$

Since, all of them used half of their pencils,
∴ each one used up equal fraction of pencils.

9. (i) $\dfrac{\overset{5}{\cancel{250}}}{\underset{8}{\cancel{400}}} = \dfrac{5}{8}$; two more fractions are $\dfrac{10}{16}, \dfrac{15}{24}$ (ii) $\dfrac{\overset{1}{\cancel{180}}}{\underset{2}{\cancel{360}}} = \dfrac{1}{2}$; two more fractions are $\dfrac{2}{4}, \dfrac{3}{6}$

(iii) $\dfrac{\overset{9}{\cancel{180}}}{\underset{10}{\cancel{200}}} = \dfrac{9}{10}$; two more fractions are $\dfrac{18}{20}, \dfrac{27}{30}$ (iv) $\dfrac{\overset{\overset{2}{\cancel{6}}}{\cancel{660}}}{\underset{\underset{3}{\cancel{9}}}{\cancel{990}}} = \dfrac{2}{3}$; two more fractions are $\dfrac{4}{6}, \dfrac{6}{9}$

(v) $\dfrac{\overset{2}{\cancel{220}}}{\underset{5}{\cancel{550}}} = \dfrac{2}{5}$; two more fractions are $\dfrac{4}{10}, \dfrac{6}{15}$

(i) — (d)   (ii) — (e)   (iii) — (a)   (iv) — (c)

(v) — (b)

EXERCISE-7.4

1. (a) $\dfrac{3}{8}, \dfrac{6}{8}, \dfrac{4}{8}, \dfrac{1}{8}$

Ascending order : $\dfrac{1}{8} < \dfrac{3}{8} < \dfrac{4}{8} < \dfrac{6}{8}$

Descending order : $\dfrac{6}{8} < \dfrac{4}{8} < \dfrac{3}{8} < \dfrac{1}{8}$

(b) $\dfrac{8}{9}, \dfrac{4}{9}, \dfrac{3}{9}, \dfrac{6}{9}$

Ascending order : $\dfrac{3}{9} < \dfrac{4}{9} < \dfrac{6}{9} < \dfrac{8}{9}$

Descending order : $\dfrac{8}{9} < \dfrac{6}{9} < \dfrac{4}{9} < \dfrac{3}{9}$

(c)

$\dfrac{5}{6} > \dfrac{2}{6}$, $\dfrac{3}{6} > 0$, $\dfrac{1}{6} < \dfrac{6}{6}$, $\dfrac{8}{6} > \dfrac{5}{6}$

2. (a) $\dfrac{3}{6} \boxed{<} \dfrac{5}{6}$ (b) $\dfrac{1}{7} \boxed{<} \dfrac{1}{4}$ (c) $\dfrac{4}{5} \boxed{<} \dfrac{5}{5}$ (d) $\dfrac{3}{5} \boxed{<} \dfrac{3}{7}$

3. Do yourself

4. (a) $\dfrac{1}{6} \boxed{<} \dfrac{1}{3}$ (b) $\dfrac{3}{4} \boxed{>} \dfrac{2}{6}$ (c) $\dfrac{2}{3} \boxed{>} \dfrac{2}{4}$ (d) $\dfrac{6}{6} \boxed{>} \dfrac{3}{3}$

(e) $\dfrac{5}{6} < \dfrac{5}{5}$ Five more such problems — Do yourself

Mathematics-6

5. (a) $\dfrac{1}{2}\boxed{>}\dfrac{1}{5}$ (b) $\dfrac{2}{4}\boxed{=}\dfrac{3}{6}$ (c) $\dfrac{3}{5}\boxed{<}\dfrac{2}{3}$ (d) $\dfrac{3}{4}\boxed{>}\dfrac{2}{8}$

(e) $\dfrac{3}{5}\boxed{<}\dfrac{6}{5}$ (f) $\dfrac{7}{9}\boxed{>}\dfrac{3}{9}$ (g) $\dfrac{1}{4}\boxed{=}\dfrac{2}{8}$ (h) $\dfrac{6}{10}\boxed{<}\dfrac{4}{5}$

(i) $\dfrac{3}{4}\boxed{<}\dfrac{7}{8}$ (j) $\dfrac{6}{10}\boxed{=}\dfrac{3}{5}$ (k) $\dfrac{5}{7}\boxed{=}\dfrac{15}{21}$

6. (a) $\dfrac{\cancel{2}^{\,1}}{\cancel{12}_{\,6}}=\dfrac{1}{6}$ (b) $\dfrac{\cancel{3}^{\,1}}{\cancel{15}_{\,5}}=\dfrac{1}{5}$ (c) $\dfrac{\cancel{8}^{\,4}}{\cancel{50}_{\,25}}=\dfrac{4}{25}$ (d) $\dfrac{\cancel{16}^{\,4}}{\cancel{100}_{\,25}}=\dfrac{4}{25}$

(e) $\dfrac{\cancel{10}}{\cancel{60}}=\dfrac{1}{6}$ (f) $\dfrac{\cancel{15}^{\,1}}{\cancel{75}_{\,5}}=\dfrac{1}{5}$ (g) $\dfrac{\cancel{12}^{\,1}}{\cancel{60}_{\,5}}=\dfrac{1}{5}$ (h) $\dfrac{\cancel{16}^{\,1}}{\cancel{96}_{\,6}}=\dfrac{1}{6}$

(i) $\dfrac{\cancel{12}^{\,4}}{\cancel{75}_{\,25}}=\dfrac{4}{25}$ (j) $\dfrac{\cancel{12}^{\,1}}{\cancel{72}_{\,6}}=\dfrac{1}{6}$ (k) $\dfrac{\cancel{3}^{\,1}}{\cancel{18}_{\,6}}=\dfrac{1}{6}$ (l) $\dfrac{4}{25}=\dfrac{4}{25}$

Equivalent groups:

Ist group = $\dfrac{1}{5}$ [(b), (f), (g)]

IInd group = $\dfrac{1}{6}$ [(a), (e), (h), (j), (k)]

IIIrd group = $\dfrac{4}{25}$ [(c), (d), (i), (l)]

7. (a) $\dfrac{5}{9}$ and $\dfrac{4}{5}$

$\dfrac{5\times5}{9\times5}=\dfrac{25}{45}$ and $\dfrac{4\times9}{5\times9}=\dfrac{36}{45}$

Since, $\dfrac{25}{45}\neq\dfrac{36}{45}$

$\therefore\ \dfrac{5}{9}\neq\dfrac{4}{5}$

(b) $\dfrac{9}{16}$ and $\dfrac{5}{9}$

$\dfrac{9\times9}{16\times9}=\dfrac{81}{144}$, $\dfrac{5\times16}{89\times16}=\dfrac{80}{144}$

Since, $\dfrac{81}{144}\neq\dfrac{81}{144}$

$\therefore\ \dfrac{9}{16}\neq\dfrac{5}{9}$

(c) $\dfrac{4}{5}$ and $\dfrac{16}{20}$

$\dfrac{4\times4}{5\times4}=\dfrac{16}{20}$, $\dfrac{16\times1}{20\times1}=\dfrac{16}{20}$

Since, $\dfrac{16}{20}=\dfrac{16}{20}$

$\therefore\ \dfrac{4}{5}=\dfrac{16}{20}$

(d) $\dfrac{1}{15}$ and $\dfrac{4}{30}$

$\dfrac{1\times2}{15\times2}=\dfrac{2}{30}$ and $\dfrac{4\times1}{30\times1}=\dfrac{4}{30}$

Since, $\dfrac{2}{30}\neq\dfrac{4}{30}$

$\therefore\ \dfrac{1}{15}\neq\dfrac{4}{30}$

8. Ila read 25 pages out of 100 pages

Fraction of reading pages = $\dfrac{25}{100} = \dfrac{1}{4}$th part of book

Lalita read $\dfrac{2}{5}$th part of book = $\dfrac{2 \times 20}{5 \times 20} = \dfrac{40}{100}$ pages

Since, $\dfrac{1}{4} < \dfrac{2}{5}$

∴ Ila read less.

9. Rafiq exercised $\dfrac{3}{6}$ of an hour.

Rohit exercised $\dfrac{3}{4}$ of an hour.

Since, $\dfrac{3}{6} < \dfrac{3}{4}$

∴ Rohit exercised for a longer time.

10. In class A, 20 passed out of 25 = $\dfrac{20}{25} = \dfrac{4}{5}$

In class B, 24 passed out of 30 i.e., $\dfrac{\overset{4}{\cancel{24}}}{\underset{5}{\cancel{30}}} = \dfrac{4}{5}$

Hence, each class have same fraction of student getting first class.

EXERCISE-7.5

1. (a) $\dfrac{1}{5} + \dfrac{2}{5} = \dfrac{3}{5}$ (b) $\dfrac{5}{5} - \dfrac{3}{5} = \dfrac{2}{5}$ (c) $\dfrac{2}{6} + \dfrac{3}{6} = \dfrac{5}{6}$

2. (a) $\dfrac{1}{18} + \dfrac{1}{18} = \dfrac{2}{18} = \dfrac{1}{9}$ (b) $\dfrac{8}{15} + \dfrac{3}{15} = \dfrac{11}{15}$ (c) $\dfrac{7}{7} - \dfrac{5}{7} = \dfrac{2}{7}$

(d) $\dfrac{1}{22} + \dfrac{21}{22} = \dfrac{22}{22} = 1$ (e) $\dfrac{12}{15} - \dfrac{7}{15} = \dfrac{5}{15} = \dfrac{1}{3}$ (f) $\dfrac{5}{8} + \dfrac{3}{8} = \dfrac{8}{8} = 1$

(g) $1 - \dfrac{2}{3}\left(1 = \dfrac{3}{3}\right)$ (h) $\dfrac{1}{4} + \dfrac{0}{4} = \dfrac{1}{4}$ (i) $3 - \dfrac{12}{5} = \dfrac{15 - 12}{5} = \dfrac{3}{5}$

$\dfrac{3}{3} - \dfrac{2}{3} = \dfrac{1}{3}$

3.   Fraction of wall painted by Shubham = $\dfrac{2}{3}$

      Fraction of wall painted by Madhavi = $\dfrac{1}{3}$

      Total painting by both of them = $\dfrac{2}{3} + \dfrac{1}{3} = \dfrac{3}{3} = 1$

∴ they painted complete wall.

4. (a) $\dfrac{7}{10} - \boxed{\dfrac{4}{10}} = \dfrac{3}{10}$ (b) $\boxed{\dfrac{8}{21}} - \dfrac{3}{21} = \dfrac{5}{21}$ (c) $\boxed{\dfrac{6}{6}} - \dfrac{3}{6} = \dfrac{3}{6}$ (d) $\boxed{\dfrac{7}{27}} + \dfrac{5}{27} = \dfrac{12}{27}$

5. Total = 1

Fraction of orange left $= 1 - \dfrac{5}{7} = \dfrac{7}{5} - \dfrac{5}{7} = \dfrac{2}{7}$

Thus, $\dfrac{2}{7}$ oranges was left in the basket.

EXERCISE-7.6

1. (a) $\dfrac{2}{3} + \dfrac{1}{7} = \dfrac{14 + 3}{21} = \dfrac{17}{21}$

(b) $\dfrac{3}{10} + \dfrac{7}{15} = \dfrac{9 + 14}{30} = \dfrac{23}{30}$

(c) $\dfrac{4}{9} + \dfrac{2}{7} = \dfrac{28 + 18}{63} = \dfrac{46}{63}$

(d) $\dfrac{5}{7} + \dfrac{1}{3} = \dfrac{15 + 7}{21} = \dfrac{22}{21} = 1\dfrac{1}{21}$

(e) $\dfrac{2}{5} + \dfrac{1}{6} = \dfrac{12 + 5}{30} = \dfrac{17}{30}$

(f) $\dfrac{4}{5} + \dfrac{2}{3} = \dfrac{12 + 10}{15} = \dfrac{22}{15} = 1\dfrac{7}{15}$

(g) $\dfrac{3}{4} - \dfrac{1}{3} = \dfrac{9 - 4}{12} = \dfrac{5}{12}$

(h) $\dfrac{5}{6} - \dfrac{1}{3} = \dfrac{5 - 2}{6} = \dfrac{\cancel{3}^{\,1}}{\cancel{6}_{\,2}} = \dfrac{1}{2}$

(i) $\dfrac{2}{3} + \dfrac{3}{4} + \dfrac{1}{2} = \dfrac{8 + 9 + 6}{12} = \dfrac{23}{12} = 1\dfrac{11}{12}$

(j) $\dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{6} = \dfrac{3 + 2 + 1}{6} = \dfrac{\cancel{6}^{\,1}}{\cancel{6}} = 1$

(k) $1\dfrac{1}{3} + 3\dfrac{2}{3} = \dfrac{4}{3} + \dfrac{11}{3} = \dfrac{\cancel{15}^{\,5}}{\cancel{3}} = 5$

(l) $4\dfrac{2}{3} + 3\dfrac{1}{4} = \dfrac{14}{3} + \dfrac{13}{4} = \dfrac{56 + 39}{12} = \dfrac{95}{12} = 7\dfrac{11}{12}$

(m) $\dfrac{16}{5} - \dfrac{7}{5} = \dfrac{16 - 7}{5} = \dfrac{9}{5} = 1\dfrac{4}{5}$

(n) $\dfrac{4}{3} - \dfrac{1}{2} = \dfrac{8 - 3}{6} = \dfrac{5}{6}$

2. Sarita bought ribbon $= \dfrac{2}{5}$ m

Lalita bought ribbon $= \dfrac{3}{4}$ m

Total length of ribbon $= \dfrac{2}{5} + \dfrac{3}{4} = \dfrac{8 + 15}{20} = \dfrac{23}{20} = 1\dfrac{3}{20}$ m

$\therefore$ they bought $1\dfrac{3}{20}$ m of ribbon.

3. Cake taken by Naina $= 1\dfrac{1}{2}$ piece $= \dfrac{3}{2}$ piece

Cake taken by Najma $= 1\dfrac{1}{3}$ piece $= \dfrac{4}{3}$ piece

Total cake taken $= \dfrac{3}{2} + \dfrac{4}{3} = \dfrac{9 + 8}{6} = \dfrac{17}{6} = 2\dfrac{5}{6}$

4. (a) $\boxed{\dfrac{7}{8}} - \dfrac{5}{8} = \dfrac{1}{4}$ (b) $\boxed{\dfrac{7}{10}} - \dfrac{1}{5} = \dfrac{1}{2}$ (c) $\dfrac{1}{2} - \boxed{\dfrac{2}{6}} = \dfrac{1}{6}$

5. (a)

⊕		
2/3	4/3	6/3
1/3	2/3	3/3
1/3	2/3	3/3

(with ⊖ on the left)

(b)

⊕		
1/2	1/3	5/6
1/3	1/4	7/12
1/6	1/12	3/12

(with ⊖ on the left)
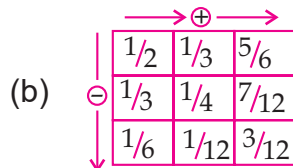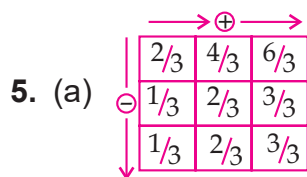
6. Total length of wire $= \dfrac{7}{8}$ m

Length of first part $= \dfrac{1}{4}$ m

Remaining part $= \dfrac{7}{8} - \dfrac{1}{4} = \dfrac{7-2}{8} = \dfrac{5}{8}$ m

$\therefore$ The length of remaining part is $\dfrac{5}{8}$ m.

7. Total distance between school and house $= \dfrac{9}{10}$ km

Distance covered by bus $= \dfrac{1}{2}$ km

Remaining distance $= \dfrac{9}{10} - \dfrac{1}{2} = \dfrac{9-5}{10} = \dfrac{4}{10} = \dfrac{2}{5}$ km

8. $\dfrac{5}{6}$ and $\dfrac{2}{5}$

$\dfrac{5 \times 5}{6 \times 5} = \dfrac{25}{30}$ and $\dfrac{2 \times 6}{5 \times 6} = \dfrac{12}{30} \Rightarrow \dfrac{25}{30} > \dfrac{12}{30} \Rightarrow \dfrac{5}{6} > \dfrac{2}{5}$

$\therefore$ Asha's bookself is more covered than samueal.

9. Time taken by Jaidev $= 2\dfrac{1}{5}$ min. $= \dfrac{11}{5}$ min.

Time taken by Rahul $= \dfrac{7}{4}$ min.

Difference $= \dfrac{11}{5} - \dfrac{7}{4} = \dfrac{44 - 35}{20} = \dfrac{9}{20}$ min.

Thus, Rahul takes less time, which is $= \dfrac{9}{20}$ min.

SUBJECT ENRICHMENT EXERCISE

I. (1) 7   (2) is equal to 1   (3) Unit fraction   (4) Proper fraction

(5) $\dfrac{22}{5}$ (6) $\dfrac{18}{42}$ (7) 2   (8) a fraction

(9) $\dfrac{1}{3}$

II. (1) Fraction   (2) 1   (3) 1   (4) Like

(5) Improper   (6) $\dfrac{5}{2}$ (7) Less   (8) Numerator

(9) $\dfrac{17}{4}$ (10) Unlike fraction

III. (1) True   (2) True   (3) True   (4) True
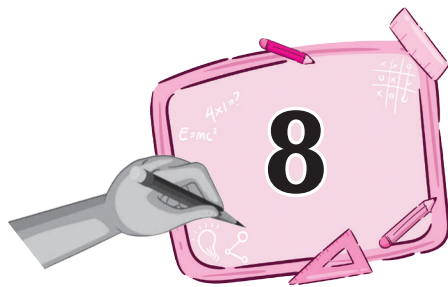
Decimals

EXERCISE-8.1

1. (a) 4375.756   (b) 0.009   (c) 14.07   (d) 74.059

	Thousand (1000)	Hundreds (100)	Tens (10)	Ones (1)	Tenths $\left(\dfrac{1}{10}\right)$	Hundredths $\left(\dfrac{1}{100}\right)$	Thousandths $\dfrac{1}{1000}$
a) 4375.756	4	3	7	5	7	5	6
b) 0.009				0	0	0	9
c) 14.07			1	4	0	7	
d) 74.059			7	4	0	5	9

2. (a) $276.05 = 200 + 70 + 6 + \dfrac{5}{100}$

Two hundred seventy-six point zero five

OR

Two hundred seventy-six and five hundredths

(b) $0.29 = 0 + \dfrac{2}{10} + \dfrac{9}{100}$

Twenty nine hundredths

(c) $6.003 = 6 + \dfrac{3}{1000}$

Six and three thousandths

(d) $0.514 = 0 + \dfrac{5}{10} + \dfrac{1}{100} + \dfrac{4}{100}$

Zero point five one four

3. (a) 45.201   (b) 5432.12   (c) 274.007   (d) 33.735

4. (a) 7.4   (b) 12.05   (c) 60.756   (d) 235.06

5. (b) 9 and 236 thousandths   (c) 79 and 6 hundredth

(d) 1 and 3 tens   (e) 27 and 3 hundredth

(f) 0 and 6 ten thousandths   (g) 0 and 7 thousandths

(h) 3 and 60 hundredth

6. (b) 24.395   (c) 3000.8

(d) 16.102   (e) 29.007

(f) 68.5   (g) 2600.04   (h) 21304.07

7. (a) $0.6 = \dfrac{\cancel{06}^{\,3}}{\cancel{10}_{\,5}} = \dfrac{3}{5}$

   (b) $1.75 = \dfrac{\cancel{1.75}^{\,7}}{\cancel{100}_{\,4}} = 1\dfrac{3}{4}$

(c) $25.5 = \dfrac{\cancel{255}^{\,51}}{\cancel{10}_{\,2}} = \dfrac{51}{2} = 25\dfrac{1}{2}$

   (d) $0.125 = \dfrac{\cancel{125}^{\,\cancel{5}^{1}}}{\cancel{1000}_{\,\cancel{40}_{8}}} = \dfrac{1}{8}$

(e) $6.4 = \dfrac{\cancel{64}^{\,32}}{\cancel{10}_{\,5}} = 6\dfrac{2}{5}$

8. (a) $0.6 = \dfrac{6}{10}$ (b) $1.75 = \dfrac{175}{100}$ (c) $25.5 = \dfrac{255}{10}$ (d) $0.175 = \dfrac{175}{1000}$

(e) $2.8 = \dfrac{28}{10}$

9. (a) $\dfrac{8}{10} = 0.8$ (b) $\dfrac{9}{100} = 0.09$ (c) $\dfrac{37}{100} = 0.37$ (d) $\dfrac{31}{1000} = 0.031$

(e) $\dfrac{9}{1000} = 0.009$ (f) $\dfrac{7}{5} = \dfrac{7 \times 20}{5 \times 20} = \dfrac{140}{100} = 1.40 = 1.4$

(g) $\dfrac{17}{50} = \dfrac{17 \times 2}{50 \times 2} = \dfrac{34}{100} = 0.34$ (h) $\dfrac{29}{200} = \dfrac{29 \times 5}{200 \times 5} = \dfrac{145}{1000} = 0.145$

(i) $\dfrac{18}{25} = \dfrac{18 \times 4}{25 \times 4} = \dfrac{72}{100} = 0.72$ (j) $\dfrac{6}{18} = \dfrac{3}{9} = \dfrac{1}{3} = 0.33$

EXERCISE-8.2

1. (a)

(b)

(c)

(d)

(e)

2. (a) 2p

$\overline{1} = 100p$

$1p = \overline{1}\,\dfrac{1}{100}$

$2p = \overline{1}\,\dfrac{2}{100} = \overline{1}0.02$

(b) 13p

$\overline{1} = 100p$

$1p = \overline{1}\,\dfrac{1}{100}$

$2p = \overline{1}\,\dfrac{13}{100} = \overline{1}0.13$

(c) 20p

$1p = \overline{1}\,\dfrac{1}{100}$

$20p = \overline{1}\,\dfrac{20}{100} = \overline{1}0.20$

(d) 4 rupees 12 paise

$4 + \dfrac{12}{100} = 4 + 0.12 = \overline{1}4.12$

(e) 13 rupee 7 paise

$13 + \dfrac{7}{100} = 13 + 0.07 = \overline{1}13.07$

(f) 145 rupees 75 paise

$145 + \dfrac{75}{100} = 145 - 75 = \overline{1}145.75$

(g) 500 rupees 9 paise

$500 + \dfrac{9}{100} = 500 + 0.09 = 500.09$

3. (a) 580 g

$1\,g = \dfrac{1}{1000}\,kg$

$580\,g = \dfrac{580}{1000}\,kg = 0.580\,kg$

(b) 7 g

$1\,g = \dfrac{1}{1000}\,kg$

$7\,g = \dfrac{7}{1000}\,kg = 0.007\,kg$

(c) 1683 g

$1\,g = \dfrac{1}{1000}\,kg$

$1683\,g = \dfrac{1683}{1000}\,kg = 1.683\,kg$

(d) 1400 g

$1\,g = \dfrac{1}{1000}\,kg$

$1400\,g = \dfrac{1400}{1000}\,kg = 1.400\,kg$

(e) 3 kg 150 g

$\left(3 + \dfrac{150}{1000}\right)\,kg = 3.150\,kg$

(f) 780 kg 4 g

$780\,kg + \dfrac{4}{1000}\,kg = 780 + 0.004 = 780.004\,kg$

(g) 1000 kg 500 g

$\left(1000 + \dfrac{500}{1000}\right)\,kg = (1000 + 0.500)\,kg = 1000.500\,kg$

(h) 2000 g

$\dfrac{2000}{1000}\,kg = 2\,kg$

4. (a) 5 mm

1 cm = 10 mm

$1\,mm = \dfrac{1}{10}\,cm \Rightarrow 5\,mm = \dfrac{5}{10}\,cm = 0.5\,cm$

(b) 82 mm

$1 \text{ mm} = \frac{1}{10} \text{ cm} \Rightarrow 82 \text{ mm} = \frac{82}{10} \text{ cm} = 8.2 \text{ cm}$

(c) 432 mm

$1 \text{ mm} = \frac{1}{10} \text{ cm}$

$\frac{432}{10} \text{ cm} = 43.2 \text{ cm}$

(d) 3 cm 8 mm

$\left(3 + \frac{8}{10}\right) \text{ cm} = (3 + 0.8) \text{ cm} = 3.8 \text{ cm}$

(e) 32 cm 6 mm

$\left(32 + \frac{6}{10}\right) \text{ cm} = (32 + 0.6) \text{ cm} = 32.6 \text{ cm}$

(f) 9 cm 3 mm

$(9 + 0.3) \text{ cm} = 9.3 \text{ cm}$

(g) 190 cm 75 mm

$(190 + 75) \text{ cm} = 197.5 \text{ cm}$

(h) 976 mm

$\frac{976}{10} \text{ cm} = 97.6 \text{ cm}$

5. (a) 9 cm

$1 \text{ cm} = \frac{1}{100} \text{ m}$

$9 \text{ cm} = \frac{9}{100} \text{ m} = 0.09 \text{ m}$

(b) 56 cm

$56 \text{ cm} = \frac{56}{100} \text{ m} = 0.56 \text{ m}$

(c) 345 cm

$345 \text{ cm} = \frac{345}{100} \text{ m} = 3.45 \text{ m}$

(d) 1461 cm

$1461 \text{ cm} = \frac{1461}{100} \text{ m} = 14.61 \text{ m}$

(e) 5 m 8 cm

$\left(5 + \frac{8}{100}\right) \text{ m} = (5 + 0.8) \text{ cm} = 5.08 \text{ cm}$

(f) 781 mm

$1 \text{ mm} = \frac{1}{1000} \text{ m}$

$781 \text{ mm} = \frac{781}{1000} \text{ m} = 0.781 \text{ m}$

(g) 75 cm 3 mm

$75 \text{ cm} = 0.75 \text{ m}$

$3 \text{ mm} = \frac{3}{1000} = 0.003 \text{ m}$

$(0.75 + 0.003) \text{ m} = 0.753 \text{ m}$

(h) 242 cm

$242 \text{ cm} = \frac{242}{100} \text{ m} = 2.42 \text{ m}$

6. (a) 3 m

$1 \text{ km} = 1000 \text{ m}$

$1 \text{ m} = \frac{1}{1000} \text{ km}$

$3 \text{ m} = \frac{3}{1000} \text{ km} = 0.003 \text{ km}$

(b) 21 m

$21 \text{ m} = \frac{21}{1000} \text{ km} = 0.021 \text{ km}$

(c) 489 m

$489 \text{ m} = \dfrac{489}{1000} \text{ km} = 0.489 \text{ km}$

(d) $3326 \text{ m} = \dfrac{3326}{1000} \text{ km} = 3.326 \text{ km}$

(e) $2 \text{ km } 9 \text{ m} = \left(2 + \dfrac{9}{1000}\right) \text{ km} = (2 + 0.009) \text{ km} = 2.009 \text{ km}$

(f) $576 \text{ m} = \dfrac{576}{1000} \text{ km} = 0.576 \text{ km}$

(g) 7489 cm

$1 \text{ cm} = \dfrac{1}{100000} \text{ km}$

$7489 \text{ cm} = \dfrac{7489}{100000} = 0.07489 \text{ km}$

(h) 80 m

$80 \text{ m} = \dfrac{80}{1000} \text{ km} = 0.080 \text{ km}$

7. (a) 8125 ml as l

$1 \text{ l} = 1000 \text{ ml}$

$1 \text{ ml} = \dfrac{1}{1000} \text{ l}$

$8125 \text{ ml} = \dfrac{8125}{1000} \text{ m} = 8.125 \text{ l}$

(b) 4 mg as g

$1 \text{ mg} = \dfrac{1}{1000} \text{ g}$

$4 \text{ mg} = \dfrac{4}{1000} \text{ g} = 0.004 \text{ g}$

(c) 36 g as kg

$1 \text{ g} = \dfrac{1}{1000} \text{ kg}$

$36 \text{ g} = \dfrac{36}{1000} \text{ kg} = 0.036 \text{ kg}$

(d) 5 rupee 2 paise as rupee

$₹\left(5 + \dfrac{2}{100}\right) = ₹(5 + 0.02) = ₹5.02$

EXERCISE-8.3

1. (a) 6.06 < 6.6   (b) 0.74 < 7.4   (c) 60.03 < 60.30   (d) 0.436 = 0.4360
   (e) 32.7 < 33.2   (f) 34.6 = 34.60   (g) 3.73 > 3.63   (h) 6.04 < 6.40
2. (a) 3.275 < 3.524 < 3.572 < 3.725   (b) 7.018 < 7.081 < 7.108 < 7.801
   (c) 21.590 < 21.600 < 21.710 < 21.800   (d) 4.090 < 4.381 < 4.70 < 4.8
3. (a) 5.16 + 3.24 = 8.40

$\begin{array}{r} 5.16 \\ +\ 3.24 \\ \hline 8.40 \\ \hline \end{array}$

(b) 0.8 + 0.6 = 1.4

$\begin{array}{r} 0.8 \\ +\ 0.6 \\ \hline 1.4 \\ \hline \end{array}$

(c) 67 + 3.751 = 70.751

$\begin{array}{r} 67.000 \\ +\ \ 3.751 \\ \hline 70.751 \\ \hline \end{array}$

(d) 5.4 + 6.7 = 12.1

$\begin{array}{r} 5.4 \\ +\ 6.7 \\ \hline 12.1 \\ \hline \end{array}$

(e) 2.165 + 3.278 = 5.443

　　　2.165
　　+ 3.278
　　　5.443

(f) 14.354 + 9.109 = 23.463

　　　14.354
　　+ 9.109
　　　23.463

(g)

　　　3.81
　　　3.17
　　+ 4.36
　　　11.34

(h) 601.3 + 108.91 = 710.21

　　　601.30
　　+ 108.91
　　　710.21

(i)　　1.0
　　+ 0.3
　　　1.3

(j)　　71.290
　　　　1.369
　　+ 88.800
　　　161.459

(k)　　3.11
　　　1.50
　　+ 4.00
　　　8.61

(l)　　　3.2
　　+ 354.1
　　　357.3

4. (a)　　7.77
　　　− 3.33
　　　　4.44

(b)　　8.54
　　− 6.01
　　　2.53

(c)　　8.26
　　− 3.88
　　　4.38

(d)　　17.60
　　− 4.69
　　　12.91

(e)　　3.000
　　− 1.013
　　　1.987

(f)　　11.111
　　− 1.111
　　　10.000

(g)　　28.674
　　− 21.260
　　　7.414

(h)　　34.170
　　− 27.717
　　　6.453

(i)　　53.100
　　− 35.111
　　　17.989

(j)　　7.000
　　− 0.467
　　　6.533

(k)　　100.000
　　− 69.69
　　　30.31

(l)
$$\begin{array}{r} 436.2 \\ - \ 364.123 \\ \hline 72.077 \end{array}$$

5. (a) $4.5 + 5 - 6.4 = 9.5 - 6.4 = 3.1$
   (b) $2.8 + 1.1 - 2.9 = 3.9 - 2.9 = 1.0$
   (c) $3 - 3.3 + 1.8$
        $3 + 1.8 - 3.3 = 4.8 - 3.3 = 1.5$
   (d) $3.28 + 1.63 - 4.9$
        $4.91 - 4.90 = 0.01$
   (e) $2.36 - 3.24 + 2.18 = 2.36 + 2.18 - 32.4 = 4.54 - 3.24 = 1.30$
   (f) $6.7 + 3.21 - 7.463 = 9.91 - 7.463 = 2.447$
   (g) $48.93 + 50.05 + 10.007 = 108.987$
   (h) $63.368 + 21.732 - 35.1 = 85.100 - 35.100 = 50.0 = 50.0$
   (i) $2.67 - 1.787 + 1.878 = 2.67 + 1.878 - 1.787 = 4.548 - 1.787 = 2.761$
   (j) $101.28 + 29.19 - 30.27 = 130.47 - 30.27 = 100.2$
   (k) $43.16 + 493.28 - 506.44 = 536.44 - 506.44 = 30$

6.
$$\begin{array}{r} 7.000 \\ - \ 5.248 \\ \hline 1.752 \end{array}$$

∴ 1.752 should be added to 5.248 to get 7.

7. Difference of 2.14 and 1.026
$$\begin{array}{r} 2.140 \\ - \ 1.026 \\ \hline 1.114 \end{array}$$

$$\begin{array}{r} 8.000 \\ - \ 1.114 \\ \hline 6.886 \end{array}$$

∴ 6.866 should be added to the difference of 2.14 and 1.026 to get 8.

8. Sum of 15.27 and 9.76
$$\begin{array}{r} 15.27 \\ + \ \ 9.76 \\ \hline 25.03 \end{array}$$

Difference of 15.27 and 9.76
$$\begin{array}{r} 15.27 \\ - \ \ 9.76 \\ \hline 5.51 \end{array}$$

Difference between their sum and difference

```
  25.03
-  5.51
───────
  19.52
───────
```

∴ 19.52 is the sum of 15.27 and 9.76 greater than their difference

9. Difference of 714 and 417.67

```
   714.00
- 417.67
─────────
   296.33
─────────
```

Sum of 714 and 417.67

```
   714.00
+ 417.67
─────────
 1,131.67
─────────
```

Difference between their sum and difference of the number

```
  1131.67
-  296.33
─────────
   835.34
─────────
```

NCERT CORNER

EXERCISE-8.1

1.

H	T	O	Tenths
0	3	1	2
1	1	0	4

2.

H	T	O	Tenths
0	1	9	4
0	0	0	3
0	1	0	6
2	0	5	9

3. (a) $\dfrac{7}{10} = 0.7$

(b) $20 + \dfrac{9}{10} = 20.9$

(c) 14.6

(d) $100 + 2 = 102$

(e) 600.8

4. (a) $\dfrac{5}{10} = 0.5$

(b) $3 + \dfrac{7}{10} = 3.7$

(c) $200 + 60 + 5 + \dfrac{1}{10} = 265.1$

(d) $70 + \dfrac{8}{10} = 70.8$

(e) $\dfrac{88}{10} = 8.8$

(f) $4\dfrac{2}{10} = 4 + \dfrac{2}{10} = 4.2$

(g) $\dfrac{3}{2} = \dfrac{3 \times 5}{2 \times 5} = \dfrac{15}{10} = 1.5$

(h) $\dfrac{2}{5} = \dfrac{2 \times 2}{5 \times 2} = \dfrac{4}{10} = 0.4$

(i) $\dfrac{12}{5} = \dfrac{12 \times 2}{5 \times 2} = \dfrac{24}{10} = 2.4$

(j) $3\dfrac{3}{5} = \dfrac{18 \times 2}{5 \times 2} = \dfrac{36}{10} = 3.6$

(k) $4\dfrac{1}{2} = \dfrac{9 \times 5}{2 \times 5} = \dfrac{45}{10} = 4.5$

5. (a) $0.6 = \dfrac{\overset{3}{\cancel{6}}}{\underset{5}{\cancel{10}}} = \dfrac{3}{5}$

(b) $2.5 = \dfrac{\overset{5}{\cancel{25}}}{\underset{2}{\cancel{10}}} = \dfrac{5}{2}$

(c) $1.0 = \dfrac{10}{10} = 1$

(d) $3.8 = \dfrac{\overset{19}{\cancel{38}}}{\underset{5}{\cancel{10}}} = \dfrac{19}{5}$

(e) $13.7 = \dfrac{137}{10}$

(f) $21.2 = \dfrac{\overset{106}{\cancel{212}}}{\underset{5}{\cancel{10}}} = \dfrac{106}{5}$

(g) $6.4 = \dfrac{\overset{32}{\cancel{64}}}{\underset{5}{\cancel{10}}} = \dfrac{32}{5}$

6. (a) $2\text{ mm} = \dfrac{2}{10}\text{ cm} = 0.2\text{ cm}$ $\left[\because 1\text{mm} = \dfrac{1}{10}\text{ cm}\right]$

(b) $30\text{ mm} = \dfrac{30}{10}\text{ cm} = 3\text{ cm}$

(c) $116\text{ mm} = \dfrac{116}{10}\text{ cm} = 11.6\text{ cm}$

(d) $4\text{ cm }2\text{ mm} = \left(4 + \dfrac{2}{10}\right)\text{ cm} = (4 + 0.2)\text{ cm} = 4.2\text{ cm}$

(e) $162\text{ mm} = \dfrac{162}{10}\text{ cm} = 16.2\text{ cm}$

(f) $83\text{ mm} = \dfrac{83}{10}\text{ cm} = 8.3\text{ cm}$

7.

	Number	Lies between	Nearer to
(a)	0.8	0 and 1	1
(b)	5.1	5 and 6	5
(c)	2.6	2 and 3	3
(d)	6.4	6 and 7	6
(e)	9.1	9 and 10	9
(f)	4.9	4 and 5	5

8. (a)

(b)

(c)

(d)

9.
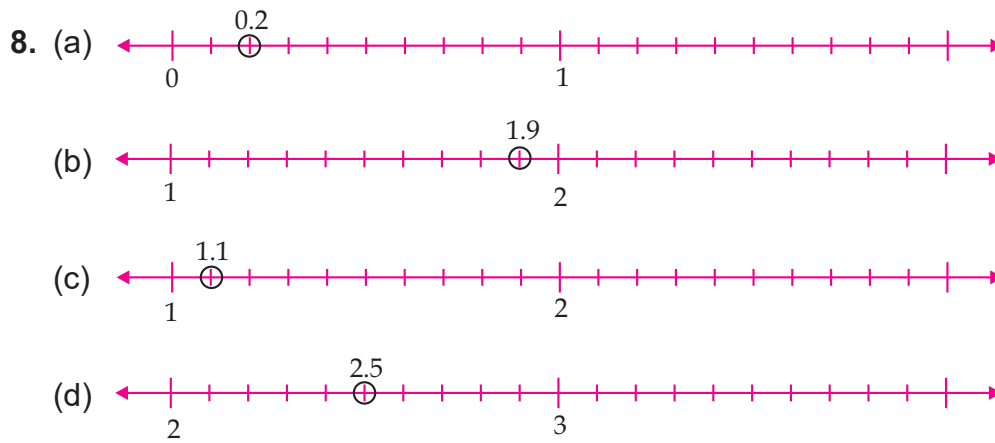
A represent 0.8   B represent 1.3

C represent 2.2   D represent 2.9

10. (a) Length of Ramesh's notebook = 9 cm 5 mm

$= 9 \text{ cm} + \dfrac{5}{10} \text{ cm} = (9 + 0.5) \text{ cm} = 9.5 \text{ cm}$

(b) Length of gram plant = 65 mm = $\dfrac{65}{10}$ cm = 6.5 cm

EXERCISE-8.2

1

	Ones	Tenths	Hundredths	Number
a)	0	2	6	0.26
b)	1	3	8	1.38
c)	1	2	8	1.28

2. (a) 3.25   (b) 102.63   (c) 30.025   (d) 211.902   (e) 12.241

3.

	Number	Hundred (100)	Tens (10)	Ones (1)	Tenths $\left(\dfrac{1}{10}\right)$	Hundredths $\left(\dfrac{1}{100}\right)$	Thousandths $\left(\dfrac{1}{1000}\right)$
a)	0.29	0	0	0	2	9	0
b)	2.08	0	0	2	0	8	0
c)	19.60	0	1	9	6	0	0
d)	148.32	1	4	8	3	2	0
e)	200.812	2	0	0	8	1	2

4. (a) 29.41   (b) 137.05   (c) 0.764   (d) 23.206   (e) 725.09

5. (a) Zero point zero three or three hundredths

(b) One point two zero

(c) One hundred eight and fifty six hundredths

(d) Ten point zero seven

(e) Zero point zero three two

(f) Five point zero zero eight

6.

	Number	Lies between the number
a)	0.06	0.0 and 0.1
b)	0.45	0.4 and 0.5
c)	0.19	0.1 and 0.2
d)	0.66	0.6 and 0.7
e)	0.92	0.9 and 1.0
f)	0.57	0.5 and 0.6

7. (a) $0.60 = \dfrac{\overset{3}{\cancel{60}}}{\underset{5}{\cancel{100}}} = \dfrac{3}{5}$

(b) $0.05 = \dfrac{\overset{1}{\cancel{5}}}{\underset{20}{\cancel{100}}} = \dfrac{1}{20}$

(c) $0.75 = \dfrac{\overset{3}{\cancel{75}}}{\underset{4}{\cancel{100}}} = \dfrac{3}{4}$

(d) $0.18 = \dfrac{\overset{9}{\cancel{18}}}{\underset{50}{\cancel{100}}} = \dfrac{9}{50}$

(e) $0.25 = \dfrac{\overset{1}{\cancel{25}}}{\underset{4}{\cancel{100}}} = \dfrac{1}{4}$

(f) $0.125 = \dfrac{\overset{1}{\cancel{125}}}{\underset{\underset{8}{\cancel{10}}}{\cancel{1000}}} = \dfrac{1}{8}$

(g) $0.066 = \dfrac{\overset{33}{\cancel{66}}}{\underset{500}{\cancel{1000}}} = \dfrac{33}{500}$

EXERCISE-8.3

1. (a) 0.3 or 0.4

$0.3 = \dfrac{3}{10}$ or $0.4 = \dfrac{4}{10}$

$\dfrac{3}{10} < \dfrac{4}{10}$ i.e $0.3 < 0.4$

∴ 0.4 is greater than 0.3

(b) 0.07 or 0.02

$0.07 = \dfrac{7}{100}$ or $0.02 = \dfrac{2}{100}$

$\dfrac{7}{100} > \dfrac{2}{100}$ i.e $0.07 > 0.02$

0.07 is greater than 0.02

(c) 3 or 0.8

$3 = \dfrac{30}{10}$ or $0.8 = \dfrac{8}{10}$

$\dfrac{30}{10} > \dfrac{8}{10}$ i.e $3 > 0.8$

3 is greater than 0.8

(d) 0.5 or 0.05

0.50 > 0.05

0.5 is greater than 0.05

(e) 1.23 or 1.2
1.23 or 1.20
1.23 > 1.20
∴ 1.23 is greater than 1.2

(f) 0.099 or 0.19
0.099 or 0.190
0.099 < 0.190
∴ 0.19 is greater than 0.099

(g) 1.5 or 1.50
1.50 or 1.50
1.50 = 1.50
∴ Both are equal

(h) 1.431 or 1.490
1.431 < 1.490
∴ 1.490 is greater than 1.431

(i) 3.3 or 3.300
3.300 or 3.300
3.300 = 3.300
∴ Both are equal

(j) 5.64 or 5.603
5.640 or 5.603
5.640 > 5.603
∴ 5.64 is greater than 5.603

2. Do it yourself

EXERCISE-8.4

1. (a) $5 \text{ p} = ₹ \dfrac{5}{100} = ₹ 0.05 \quad \left[\because 1\text{p} = \dfrac{1}{10} ₹ \right]$

(b) $75 \text{ p} = ₹ \dfrac{75}{100} = ₹ 0.75$

(c) $20 \text{ p} = ₹ \dfrac{20}{100} = ₹ 0.20$

(d) $50 \text{ rupees } 90 \text{ paise} = ₹ 50 + ₹ \dfrac{90}{100} = ₹ (50 + 0.90) = ₹ 50.90$

(e) $725 \text{ paise} = ₹ \dfrac{725}{100} = ₹ 7.25$

2. (a) $15 \text{ cm} = \dfrac{15}{100} \text{ m} = 0.15 \text{ m} \quad \left[\because 1\text{cm} = \dfrac{1}{100}\text{m} \right]$

(b) $6 \text{ cm} = \dfrac{6}{100} \text{ m} = 0.06 \text{ m}$

(c) $2 \text{ m } 45 \text{ cm} = 2\text{ m} + \dfrac{45}{100}\text{ m} = (2.45)\text{ m}$

(d) $9 \text{ m } 7 \text{ cm} = 9\text{ m} + \dfrac{7}{100}\text{ m} = (9 + 0.07)\text{ m} = 9.07 \text{ m}$

(e) $419 \text{ cm} = \dfrac{419}{100}\text{ m} = 4.19 \text{ m}$

3. (a) $5 \text{ mm} = \dfrac{5}{10} \text{ cm} = 0.5 \text{ cm} \quad \left[\because 1\text{ mm} = \dfrac{1}{10}\text{ cm} \right]$

(b) $60 \text{ mm} = \dfrac{60}{10} \text{ cm} = 6 \text{ cm} = 6.0 \text{ cm}$

(c) $164 \text{ mm} = \dfrac{164}{10} \text{ cm} = 16.4 \text{ cm}$

(d) 9 cm 8 mm = 9 cm = $\dfrac{8}{10}$ cm = (9 + 0.8) cm = 9.8 cm

(e) 93 mm = $\dfrac{93}{10}$ cm = 9.3 cm

4. (a) 8 m = $\dfrac{8}{1000}$ km = 0.008 km $\qquad \left[\because 1\,m = \dfrac{1}{1000}\,km \right]$

(b) 88 m = $\dfrac{88}{1000}$ km = 0.088 km

(c) 8888 m = $\dfrac{8888}{1000}$ km = 8.888 km

(d) 70 km 5 m = 70 km + $\dfrac{5}{1000}$ km = (70 + 0.005) km = 70.005 km

5. (a) 2g = $\dfrac{2}{1000}$ kg = 0.002 $\qquad \left[\because 1\,g = \dfrac{1}{1000}\,kg \right]$

(b) 100 g = $\dfrac{100}{1000}$ kg = 0.100 kg

(c) 3750 g = $\dfrac{3750}{1000}$ kg = 3.750 kg

(d) 5 kg 8 g = 5 kg + $\dfrac{8}{1000}$ kg = 5.008 kg

(e) 26 kg 50 g = 26 kg + $\dfrac{50}{1000}$ kg = 26.050 kg

EXERCISE-8.5

1. (a) 0.007 + 8.5 + 30.08

```
   0.007
   8.500
+ 30.080
  38.587
```

(b) 15 + 0.632 + 13.8

```
15 →       15.000
0.632 →     0.632
13.8→    + 13.800
            29.432
```

(c) 27.076 + 0.55 + 0.004

```
27.076→   27.076
0.55 →     0.550
0.004→  +  0.004
          27.630
```

(d) 25.65 + 9.005 + 3.7

```
25.65 →   25.650
9.005 →    9.005
3.7→    +  3.700
          38.355
```

(e) 0.75 + 10.425 + 2

```
10.425→   10.425
0.75 →     0.750
2→      +  2.000
          13.175
```

(f) 280.69 + 25.2 + 38

```
280.69→   280.69
25.2→      25.20
38→     +  38.00
          343.89
```

2. Money spent on Maths books = ₹ 35.75
   Money spent on Science books = ₹ 32.60
   Total money spent = ₹ 68.35
   ∴ The total money spent by Rashid = ₹ 68.35
3. Money given by Radhika's mother = ₹ 10.50
   Money given by Radhika's father = ₹ 15.80
   The total amount = ₹ 26.30
   ∴ The total amount given to Radhika by the parents is ₹ 26.30
4. Length of cloth for shirt = 3 m 20 cm = 3.20 m
   Length of cloth for trouser = 2 m 5 cm = 2.05 m
   Total length of cloth = 5.25 m
   ∴ The total length of cloth bought by her is 5 m 25 cm.
5. Walked in the morning = 2 km 35 m = 2.035 km
   Walked in the evening = 1 km 7 m = 1.007 km
   The total distance = 3.042 km
   ∴ The total distance walked by Naresh = 3.042 km = 3 km 42 m
6. Travelled by bus = 15 km 268 m = 15.268 km
   Travelled by car = 7 km 7 m = 7.007 km
   Travelled on foot = 500 m = 0.500 km
   Total distance = 22.775 km
   ∴ Distance of Sunita's school from her residence is 22 km 775 m.
7. Weight of rice = 5 kg 400 g = 5.400 kg
   Weight of sugar = 2 kg 020 g = 2.020 kg
   Weight of flour = 10 kg 850 g = 10.850 kg
   Total weight = 18.270 kg
   ∴ The total weight of his purchase = 18 kg 270 g

EXERCISE-8.6

1. (a) ₹ 18.25 from ₹ 20.75

   $$\begin{array}{r} ₹\,20.75 \\ -\,₹\,18.25 \\ \hline ₹\ \ 2.50 \\ \hline \end{array}$$

   (b) 202.54 m from 250 m

   $$\begin{array}{r} 250.00\ m \\ -\ 202.54\ m \\ \hline 47.46\ m \\ \hline \end{array}$$

   (c) ₹ 5.36 from ₹ 8.40

   $$\begin{array}{r} ₹\,8.40 \\ -\,₹\,5.36 \\ \hline ₹\ \ 2.04 \\ \hline \end{array}$$

   (d) 2.051 km from 5.206 km

   $$\begin{array}{r} 5.206\ km \\ -\ 2.051\,km \\ \hline 3.155\ km \\ \hline \end{array}$$

   (e) 0.314 kg from 2.107 kg

   $$= \begin{array}{r} 2.107\ kg \\ -\ 0.314\ kg \\ \hline 1.793\ kg \\ \hline \end{array}$$

2. (a) 9.756 – 6.28

$$\begin{array}{r} 9.756 \\ -\ 6.280 \\ \hline 3.476 \\ \hline \end{array}$$

(b) 21.05 – 15.27

$$\begin{array}{r} 21.05 \\ -\ 15.27 \\ \hline 5.78 \\ \hline \end{array}$$

(c) 18.5 – 6.79

$$\begin{array}{r} 18.50 \\ -\ \ 6.79 \\ \hline 11.71 \\ \hline \end{array}$$

(d) 11.6 – 9.847

$$\begin{array}{r} 11.600 \\ -\ 9.847 \\ \hline 1.753 \\ \hline \end{array}$$

3. Total amount given to shopkeeper = ₹ 50

Cost of book = ₹ 35.60

Amount left = ₹ 50.00 – ₹ 35.60 = ₹ 14.35

∴ Raju got back ₹ 14.35 from the shopkeeper

4. Total money = ₹ 18.50

Cost of Ice-cream = ₹ 11.75

Amount left = ₹
$$\begin{array}{r} 18.50 \\ ₹\ -11.75 \\ \hline ₹\ \ \ 6.75 \\ \hline \end{array}$$

∴ Rani has ₹ 6.75 now.

5. Total length of cloth = 20 m 5 cm = 20.05 m

Length of cloth used = 4 m 50 cm = 4.50 m

Remaining cloth = 20.05 m – 4.50 m = 15.55 m

∴ 15.55 m of cloth is left with Tina.

6. Total distance travel = 20 km 50 m = 20.050 km

Distance travelled by bus = 10 km 200 m = 10.200 km

Remaining travelled by auto = 9.850 km

∴ 9.850 km distance travels by auto.

7. Weight of onions = 3 kg 500 g = 3.500 kg

Weight of tomatoes = 2 kg 75 g = 2.075 kg

Total weight = 5.575 kg

∴ Weight of potatoes = (10.000 – 5.575) kg = 4.425 kg

Thus, weight of potatoes = 4.425 kg

SUBJECT ENRICHMENT EXERCISE

I. (1) 500.3

(2) 205.001

(3) 2.2

(4) $\dfrac{5}{8}$

(5) 4.875

(6) ₹ 15.08

(7) 0.888 km

(8) 12 kg 57 g

(9) 6 hundredths

(10) 45.908

II. (1) Unlike decimal   (2) Number line

(3) $\dfrac{4}{10}$ = 4 tenths   (4) $\dfrac{7}{100}$ = 7 parts out of 10 = 0.07

(5) $\dfrac{15}{100}$ = 0.15   (6) 0.5 and 0.6

(7) 443.405   (8) 2.467 g

(9) 1007.17   (10) 367.5

III. (1) False

(2) False

(3) False

(4) False

(5) True

9 Data Handling

1.

No. of children	Tally Marks	No. of families
0				2
1	ℕ|	6
2	ℕ ||||	9
3	ℕ	5
4					3
		25

2.

Size of shoes	Tally Marks	No. of sale of shoes
4				2
5	ℕ	5
6						4
7						4
8	ℕ		6
9	ℕ ||	7
		28

3.

Number	Tally Marks	Frequency
1	ℕ	5
2	ℕ ||	7
3	ℕ		6
4				2
5					3
		23

4.

Number	Tally Marks	Frequency
1	ⵜⵜⵜⵜⵜ	5
2	ⵜⵜⵜⵜⵜ ⵜⵜⵜⵜⵜ	10
3	ⵜⵜⵜⵜⵜ	5
		20

5. (a) Numerical figures

  (b) Original form

  (c) Array

  (d) Frequency

  (e) Frequency table

6. (a) Class XI has read the most number of books.

  (b) Class X and XII has read the least number of books.

  (c) 100 books more were read by class IX students than class X students.

  (d) 200 more books were read by class XI students than class XII students.

7. (a) Taruna = 1 picture = 40 matchboxes

  7 pictures = 7 × 40 matchboxes = 280 matchboxes

  Taruna collect = 280 matchboxes

  Sapna collect = 5 × 40 = 200 matchboxes

  Kanika = 7 × 40 = 280 matchboxes

  Rahul collect = 4 × 40 = 160 matchboxes

  Total matchboxes = 280 + 200 + 280 + 160 = 920 matchboxes

  (b) Taruna have 280 matchboxes

  (c) Rahul

  (d) Taruna and Kanika

  (e) 40 matchboxes

8. 1 rupee coins = 1 crore

  50 paise coins = 1/2 crore = 50,00,000

  Invest in book shop = 5 coin × 1 crore = 5 crore

  In untensil shop = 2 of Rs 1 coin × 1 crore + 1 of 50 paise coin × 50,00,000

  　　　　　 = 2 crore + 50 lakh

  Fast food shop = 2 of Rs 1 coin × 1 crore = 2 crore

  Electric shop = 4 of Rs 1 coin × 1 crore - 4 crore

  (a) 13 crore 50 lakh

  (b) Book shop

  (c) Book shop

  (d) Fraction = $\dfrac{2,00,00,000}{13,50,00,000} = \dfrac{20}{135} = \dfrac{4}{27}$

9.

By Walking	★ ★ ★ ★
By Bicycle	★ ★ ★ ★ ⤙
By Car	★ ★
By Bus	★ ★ ★ ★ ★ ★ ★

1 ★ represent = 10 students

⤙ represent = 5 students

10.

Monday	☐ ☐ ☐ ⊏
Tuesday	☐ ⊏
Wednesday	☐ ☐ ⊏
Thursday	☐
Friday	☐ ☐ ☐

☐ = 2 absentees

EXERCISE-9.2

1. (a) January

(b) Snowfall in January = 150 cm

Snowfall in December = – 140 cm

Diff = 10 cm

10 cm more snowfall is there is January than in December

(c) 60 cm of snowfall was there in the month of March.

(d) November

(e) 40 matchboxes

2. (a) 48 students   (b)Water park

(c) Sea side   (d)16 students

3. (a) The bar graph gives the information of marks earned in each subject by student.

(b) The students is weak in Science subject.

(c) The student is best in Maths subject.

(d) He got more than 40 marks in HIndi and Maths.

4. (a) The information are given by bar graph is the number of members in each family of a colony.

(b) 10 families have 3 members.

(c) 5 members

(d) 4 members family is most common.

5. (a) 2nd week

(b) 4th week

(c) 3600 cycles

(d) 2400 cycles were produced in the first 3 weeks.

6. (a) This bar graph show that the different modes of transport to a school is used by 56 students from a locality.

(b) Bicycle

(c) 15 students

(d) 41 students

7.
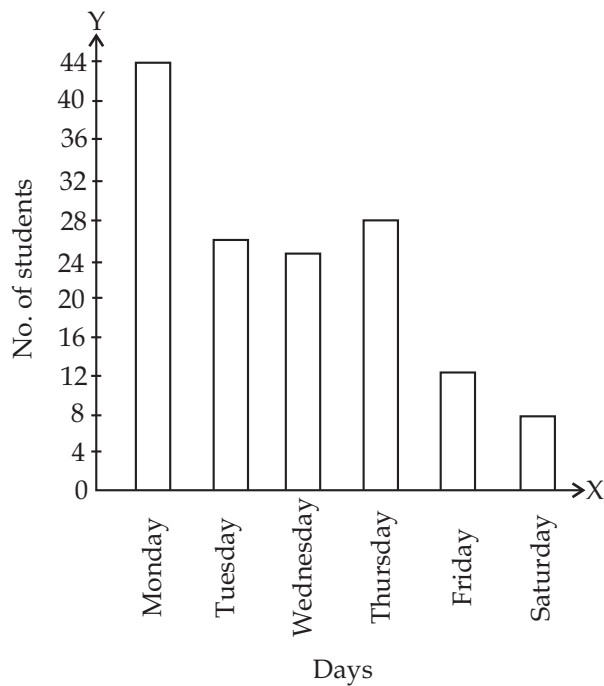
8.
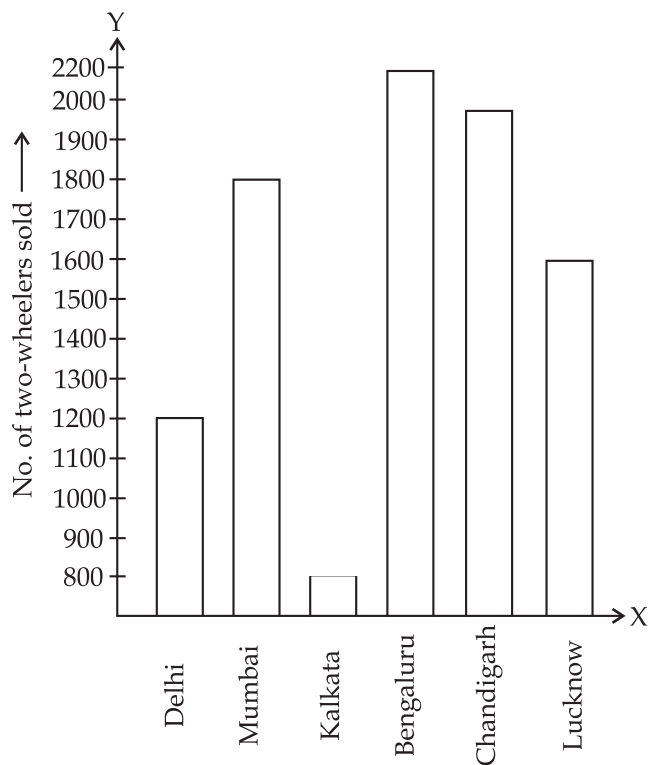
(a) Bengaluru

(b) 200 two-wheelers

(c) $\dfrac{1200}{9600} \times 100 = \dfrac{100}{8} = 12.5\%$

(d) Ratio = $\dfrac{\text{sold in Kolkata}}{\text{sold in Chandigarh}} = \dfrac{800}{2000} = \dfrac{2}{5}$

2 : 5

9. (a) Bar graph – Do it yourself

(b) 2 employees have salary less than ₹ 50,000

(c) 5th employee

10. Draw bar graph = Do it yourself

---

1. Tally Marks:-

Marks	Tally marks	No. of students
1	||	2
2	|||	3
3	|||	3
4	̷̷̷̷̷|||| ||	7
5	̷̷̷̷̷||||	6
6	̷̷̷̷̷|||| ||	7
7	̷̷̷̷̷||||	5
8	||||	4
9	|||	3

(a) 12 students

(b) 8 students

2. (a)

Sweets	Tally Marks	No. of students
Ladoo	̷̷̷̷̷|||| ̷̷̷̷̷|||||	11
Barfi	|||	3
Jalebi	̷̷̷̷̷||||||	7
Rasgulla	̷̷̷̷̷||||||||	9
		30

(b) Ladoo

3.

Numbers	Tally Marks	How many times?
1	̷̷̷̷̷||||||	7
2	̷̷̷̷̷|||||	6
3	̷̷̷̷̷||||	5
4	||||	4
5	̷̷̷̷̷|||| ̷̷̷̷̷|||||	11
6	̷̷̷̷̷||||||	7

(a) The minimum number of times = 4

(b) The maximum number of times = 5   (c) 1 and 6

4. (a) Village D   (b) Village C   (c) 3   (d) 28

5. (a) Class VIII   (b) No   (c) 3 × 4 = 12 girls

6. (a) 14 balls   (b) Sunday   (c) Wednesday and Saturday

   (d) Wednesday and Saturday

   (e) The total number of bulbs were sold in the given week = 86 bulbs

   1 box contains bulbs = 9

   Total bulb = 86

   Number of cartoon needed = $\dfrac{86}{9}$ = $9\dfrac{5}{9}$

   10 cartoon can hold 86 bulbs

7. (a) Martin sold maximum number of baskets.

   (b) Anwar sold 7 × 100 = 700 fruit baskets.

   (c) The merchants who are planning to buy a godown for the next season are Anwar, Martin, and Ranjit Singh.

EXERCISE-9.2

1. (a) 6 symbols

   (b) Village B

   (c) Village C has more animals than that of Village A.

	⊗ = 10 animals
Village A	⊗⊗⊗⊗⊗⊗⊗⊗
Village B	⊗⊗⊗⊗⊗⊗⊗⊗⊗⊗⊗⊗⊗
Village C	⊗⊗⊗⊗⊗⊗⊗⊗⊗
Village D	⊗⊗⊗⊗
Village E	⊗⊗⊗⊗⊗⊗

2. **A.**

	♀ = 100 Students
1996	♀♀♀♀
1998	♀♀♀♀♀♪
2000	♀♀♀♀♪
2002	♀♀♀♀♀♀
2004	♀♀♀♀♀♀

   (a) 6 symbols

   (b) 5 complete symbols and incomplete symbol of 35 students represent total number of students in the year 1998.

   B. Do it yourself same as part A.

EXERCISE-9.3

1. The given bar graph represents the amount of wheat (in thousand tonnes) purchased by the government during the years 1998-2002.

   The amount of wheat purchased during 1998-2002 is 15 + 25 + 20 + 20 + 30 = 110 thousand tonnes.

   (a) In 2002

   (b) In 1998

2. (a) The given bar graph represents the number of shirts sold from Monday to Saturday in a ready made shop.
   (b) 1 unit length = 5 shirts
   (c) Saturday and 60 shirts in number
   (d) Tuesday
   (e) 35

3. (a) The bar graph show that the marks obtained by Aziz in half yearly examination in different subject
   (b) Hindi
   (c) Social science
   (d) Hindi = 80, English = 60, Maths = 70, Science = 50, Social science = 40

EXERCISE-9.4

1. Reading story books

1 unit length = 5 student

1 unit length = 5 books

2.

Mathematics-6

3.

1 unit length = 100 bicycles

No. of bicycles manufactured →

Years

(a) 2002   (b) 1999

4.

▢ = 20 thousand

No. of person →

Age Groups
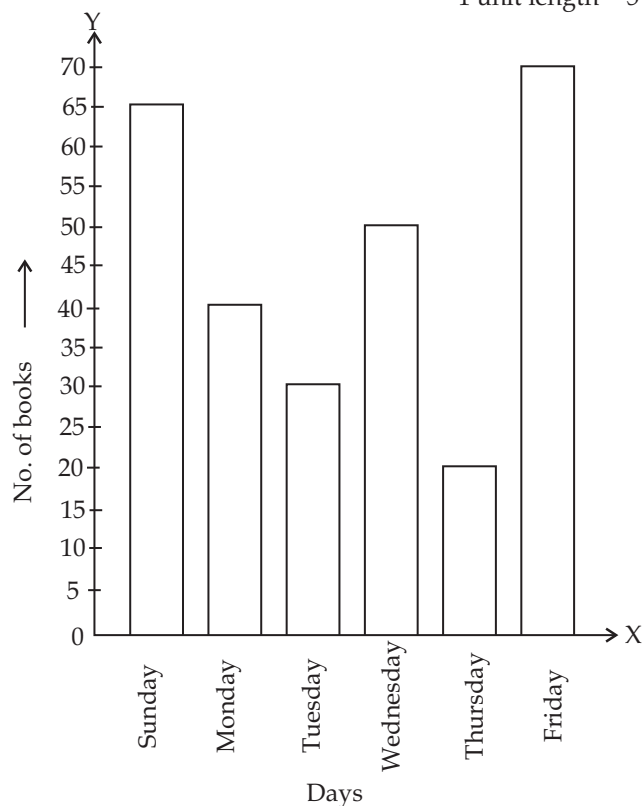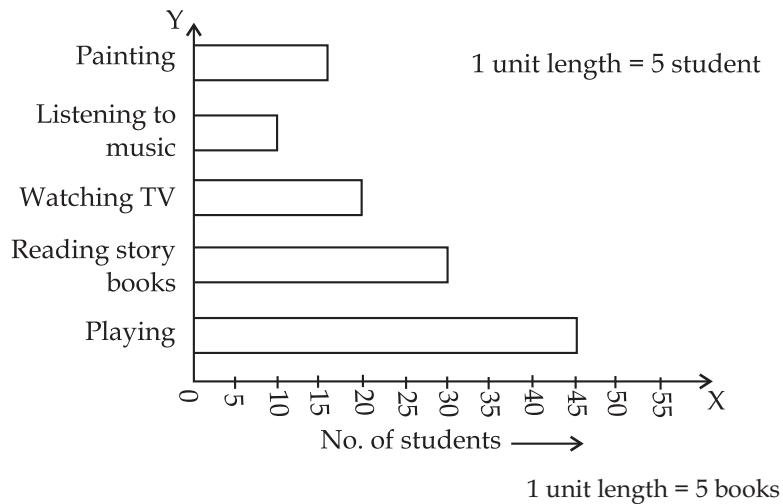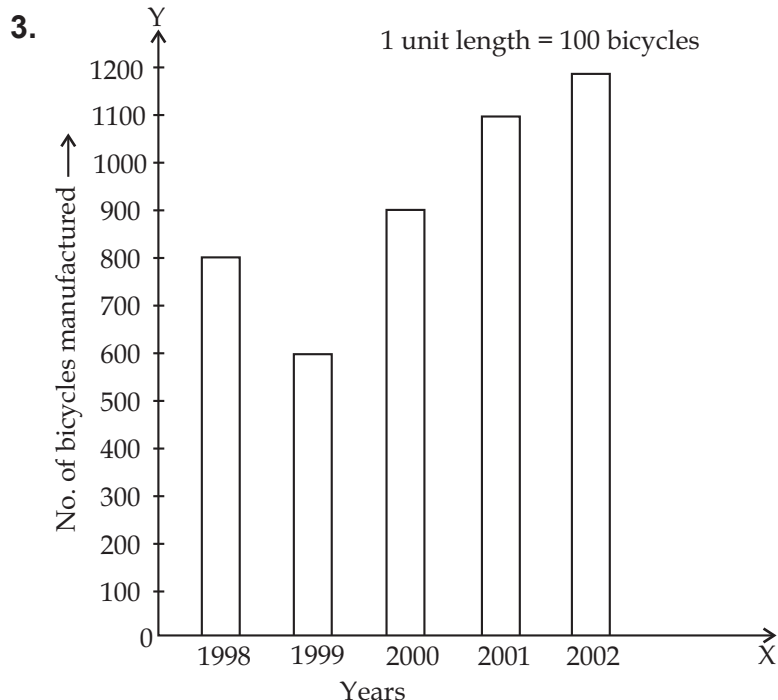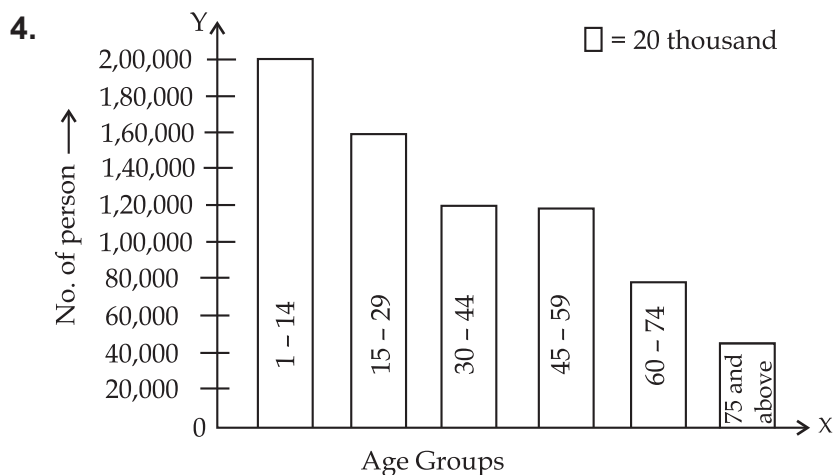
(a) Group 30–34 and group 45–59

(b) 80,000 + 40,000 = 1,20,000

SUBJECT ENRICHMENT EXERCISE

I. (1) Data   (2) Pictograph
   (3) (i) Class VI   (ii) X   (iii) 240 students
   (4) (i) Mathematics   (ii) 95%   (iii) 65%   (iv) 365
   (5) 12 kg

II. (1) Numerical data   (2) Charts and graphs   (3) Glance
   (4) Different   (5) Vertically, horizontally
   (6) Interpreting   (7) Pictograph   (8) Same   (9) Tally marks

III. (1) True   (2) False   (3) False   (4) True
   (5) False   (6) True
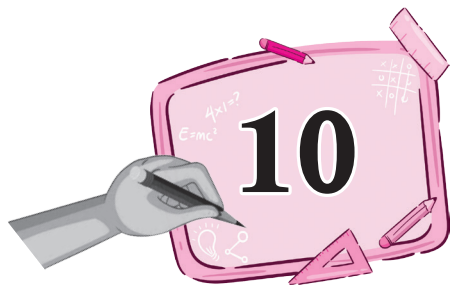
10 Mensuration

EXERCISE-10.1

1. (a) Perimeter of square = Sum of all sides = 40 m + 40 m + 40 m + 40 m = 160 m
   (b) Perimeter of rectangle = 2 (L + B) = 2 (100 + 150) m = 2 (250) m = 500 m
   <div align="center">OR</div>

   Perimeter of rectangle = 100 m + 150 m + 100 m + 150 m = 500 m
   (c) Perimeter of triangle = 10 m + 10 m + 10 m = 30 m
   (d) Perimeter of fig. = Sum of all sides = 30 m + 50 m + 60 m + 90 m = 230 m
   (e) Perimeter of fig. = Sum of all sides = 9 m + 9 m + 9 m + 9 m + 9 m = 45 m
   (f) Perimeter of fig. = Sum of all sides = 20 m + 50 m + 10 m + 30 m + 10 m + 40 m = 160 m
   (g) Perimeter of fig. = Sum of all sides = 40 m + 30 m + 50 m = 120 m
   (h) Perimeter of fig. = Sum of all sides = 25 m + 30 m + 25 m + 15 m + 35 m = 130 m
   (i) Perimeter of fig. = Sum of all sides = 55 m + 80 m + 45 m + 40 m = 220 m

2. **(I)** (a) Perimeter of rectangle = 2 (L + B) = 2 (90 + 15) m = 2 (105) m = 210

   (b) Perimeter of rectangle = 2 (L + B) = 2 (220 + 120) m = 2 (340) m = 680 m
   (c) Perimeter of rectangle = 2 (L + B) = 2 (12 + 10) m = 2 (22) m = 44 m
   (II) (a) Perimeter of square = 4 (side) = 4 (4 m) = 16 m
   (b) Perimeter of square = 4 (side) = 4 (20) m = 80 m
   (c) Perimeter of square = 4 × side = 4 × (60) m = 240 m

3. The side of square field = 60 m
   Length of a fence = Perimeter of square field
   The perimeter of square field = 4 × side = 4 × 6- = 240 m

4. Side of square piece of land = 100 m
   3 layers of metal wire are to be used to fence it.
   Therefore, the total length of metal wire is 3 times of its perimeter.
   Perimeter of square piece of land = 4 × side = 4 (100) = 400 m
   The total length of wire needed due to three layer = 400 m × 3 = 1200 m

5. Length of picture = 30 cm
   Breadth of picture = 20 cm
   Perimeter of picture = 2 (L + B) = 2 (30 + 20) = 100 m
   The length of wooden frame = Perimeter of picture = 100 m
   ∴ The total length of wooden frame is needed to frame the picture is 100 m.

6. Side of square = 5 cm
   Perimeter of square = 4 side = 4 (5) = 20 cm

7. The perimeter of square = 84 m

   Length of one square garden = $\dfrac{\text{Perimeter}}{4} = \dfrac{84}{4} = 21\,\text{m}$

8. Side os square = 250 m

   Perimeter of square = 4 × side = 4 × 250 m = 1000 m

   Cost of fencing 1 m of square garden = ₹ 3.50

   Cost of fencing 1000 m of square garden = ₹ 3.50 × 1000 = ₹ 3500.00

   ∴ The total cost of fencing the garden = ₹ 3500

9. Perimeter = 36

   2 (L + B) = 36

   (L + B) = $\dfrac{36}{2}$ = 18

   Since length and breadth are positive integers in cm. Therefore, the possible dimensions are:
   (1,17) cm, (2, 16) cm, (3, 15) cm, (4, 14) cm, (5, 13) cm, (6, 12) cm, (7, 11) cm, (8, 10) cm, (9, 9) cm.

   Hence, there are 9 rectangles.

10. The total cost of constructing a boundary wall of a square field = Rs 1600

    The cost of constructing 1 m of wall = ₹ 24

    The total length the wall = $\dfrac{1600}{25}$ = 64 m

    The side of square wall = $\dfrac{\text{Perimeter of wall}}{4} = \dfrac{64}{4}$ m = 16 m

EXERCISE-10.2

1. (a) Length = 200 cm ; Breadth = 840 cm

      Area of rectangle = L × B

      = (200 × 840) cm^2 = 1,68,000 cm^2

   (b) Breadth = 5 dm 6 m ; Length = 740 cm

      = 6 m 5 dm ; L = 740 cm

      = 6 m + 0.5 m = 6.5 m

      B = 650 cm

      Area opf rectangle = L × B = (740 × 650) cm^2 = 4,81,000 cm^2

   (c) Breadth = 4 m 5 dm ; Length = 6 m 8 cm

      B = 450 cm ; L = 608 cm

      Area = L × B = (608 × 450) cm^2 = 2,73,600 cm^2

2. (a) Side = 6 m

      Area of square = Side × Side

      = (6 × 6) m^2 = 36 m^2

   (b) 22 cm

      Area of square = (side)^2 = (22)^2 cm^2 = 484 cm^2

3. Area of rectangular frame = 1,125 cm²

Width of rectangular frame = 25 cm

Length of rectangular frame = $\dfrac{\text{Area}}{\text{Width}}$ = $\dfrac{1125}{25}$ = 45 cm

Length of rectangular frame = 45 cm

4. (a) Area of square = 625 m²

Area = Side × Side

625 = Side × Side

25 × 25 = (Side)²

(25)2 = (Side)²

Side = 25 m

(b) Area = 49 sq.mm

Area of square = Side × Side

49 mm² = Side × Side

(7 × 7) mm² = Side × Side

Side = 7 mm

5. Breadth of a rectangle = 75 cm

Area of rectangle = 6750 cm²

Length of a rectangle = $\dfrac{\text{Area}}{\text{Breadth}}$ = $\dfrac{6750}{75}$ = 90 cm

∴ Length of a rectangle = 90 cm

6. Area of rectangular field = 120 m²

Perimeter of rectangular field = 46 m

Area = 120 m²

L × B = 120

$L = \dfrac{120}{B}$ ...(1)

Perimeter = 46 m

2 (L + B) = 46 m

$L + B = \dfrac{46}{2} = 23$

L + B = 23   ...(2)

$\dfrac{120 + B^2}{B} = 23 = 23$

B² + 120 = 23 B

B² + 23 B + 120 = 0

(B − 15) (B − 8) = 0

So, B = 15, 8

Hence, its dimensions are 15 m and 8 m.

7. Area of marble tile = 25 cm × 20 cm = 500 cm²

Area of floor = 4 m × 3 m = 12 m² = 1,20,00 cm²

Number of tiles = $\dfrac{\text{Area of floor}}{\text{Area of 1 tile}}$ = $\dfrac{120000}{500}$ cm² = 240 tiles

$\begin{bmatrix} \because\ 1\ m = 100\ cm \\ 1\ m^2 = (100)^2\ cm^2 \\ = 10{,}000\ cm^2 \end{bmatrix}$

8. Side of square plot = 250 m

   Area of square plot = (250 × 250) m^2 = 62,500 m^2

   The cost of 1 m^2 of levelling plot = ₹ 2

   The cost of 62500 m^2 of levelling plot = 2 × 62,500 = ₹ 1,25,000

9. Area of rectangular field = 2500 m^2

   Length of rectangular field = 50 m

   Breadth of rectangular filed = $\dfrac{\text{Area}}{\text{Length}}$ = $\dfrac{\overset{50}{\cancel{2500}}}{\underset{1}{\cancel{50}}}$ = 50 m

   Perimeter of rectangular field = 2 (L + B)

   = 2 (50 + 50) m = 2 (100) m = 200 m

10. Carpet area = 6.6 m × 5.6 m = 36.96 m^2

    Then, cost of carpet per m^2 = $\dfrac{3960}{36.96}$ = ₹ 107.14

    Now, the area of 70 cm carpet for 1 m long = 0.7 × 1 = 0.7 m^2

    Hence,

    The cost of carpet perimeter = 0.7 × 107.14 = ₹ 75

11. Length of a playground = 75 m 20 cm = 75.2 m

    Breadth of a playground = 34 m 80 cm = 34.8 m

    Area of rectangle = L × B = (75.2 × 34.8) m^2 = 2616.96 m^2

    Cost of levelling = ₹ 1.50 × 2616.96 = ₹ 3,925.44

    Perimeter of rectangle = 2 (L + B) = 2 (75.2 + 34.8) = 2 (110) = 220 m

    Time = Distance/Speed = $\dfrac{220}{1.5}$ s = 146.67 sec

12. Area of 1 brick = L × B = 20 × 15 = 300 cm^2

    Now,

    In ₹ 750 bricks used = 1000

    In ₹ 49,500 bricks used = $\dfrac{\overset{40}{\cancel{1000}}}{\underset{\underset{1}{\cancel{3}}}{\cancel{750}}}$ × $\overset{1650}{\cancel{49500}}$ = 66,000 bricks

    Let the length of lane = x cm

    Breadth = 5 m = 500 cm

    Total area of 66000 bricks = 66000 × 300 cm^2

    Area of lane = 500 × x = 500 x cm^2

    Total area of 66000 bricks = Area of lane

    66000 × 300 = 500 x

    x = $\dfrac{\overset{13200}{\cancel{66000}} \times \overset{}{\cancel{3\,00}}}{\underset{1}{\cancel{300}}}$ = 39.600 cm = 396 m

13. (i) Side of square = doubled its side = 2 × side

Area of square = Side × Side

(2 side) × (2 side)

4 side^2

(ii) Let side of square = x

Given if side of square = $\dfrac{1}{2}$ of its side = $\dfrac{1}{2} \times x$

Area of square = $\left(\dfrac{x}{2}\right)\left(\dfrac{x}{2}\right) = \dfrac{x^2}{4} = \dfrac{(\text{side})^2}{4}$

14. Length of rectangular field = 180 m

Width of rectangular field = 650 m

Area of rectangular field = L × B

= (1809 × 650) m^2 = 1,17,000 m^2

15. Total cost of flooring a room = ₹ 610

Cost of 1 m^2 flooring a room = ₹ 7.50

Area of floor of room = $\dfrac{\overset{122}{\cancel{610}}}{\underset{\underset{3}{15}}{\cancel{750}}} \times \overset{2}{\cancel{100}} = \dfrac{244}{3}$ m^2

Length of a room = 7 m

Breadth = $\dfrac{\text{Area}}{\text{Length}} = \dfrac{244}{3 \times 7}$ = 11.6 m (app.)

NCERT CORNER

EXERCISE-10.1

1. (a) Perimeter = Sum of all the sides = 4 cm + 2 cm + 1 cm + 5 cm = 12 cm

(b) Perimeter = Sum of all the sides = 23 cm + 35 cm + 40 cm + 35 cm = 133 cm

(c) Perimeter = Sum of all the sides = 15 cm + 15 cm + 15 cm + 15 cm = 60 cm

(d) Perimeter = Sum of all the sides = 4 cm + 4 cm + 4 cm + 4 cm = 20 cm

(e) Perimeter = Sum of all the sides

= 1 cm + 4 cm + 0.5 cm + 2.5 cm + 2.5 cm + 0.5 cm + 4 cm = 15 cm

(f) Perimeter = Sum of all the sides

= 4 cm + 1 cm + 3 cm + 2 cm + 3 cm + 4 cm + 1 cm +

3 cm + 2 cm + 3 cm + 4 cm + 1 cm + 3 cm + 2 cm + 3 cm +

4 cm + 1 cm + 3 cm + 2 cm + 3 cm = 52 cm

2. Total length of tape required = Perimeter of tape

= 2 (L + B) = 2 (40 + 10) cm = 100 cm = 1 m

Thus, the total length of tape required is 100 cm or 1m.

3. Length of table top = 2m 25 cm = 2.25 m

Breadth of table top = 1 m 50 cm = 1.50 m

Perimeter = 2 (L + B) = 2 (2.25 + 1.50) = 2 (3.75) = 7.50 m

4. Length of wooden strip = Perimeter of photograph

$$= 2 (L + B) = 2 (32 + 21) \text{ cm} = 2 (53) \text{ cm} = 106 \text{ cm}$$

Thus, the length of wooden strip required is equal to 106 cm.

5. Since the 4 rows of wires are needed.

∴ the total length of wires is equal to 4 times the perimeters of rectangle.

Perimeter of field = 2 (L + B) = 2 (0.7 + 0.5) km

$$= 2 (1.2) \text{ km} = 2.4 \text{ km} = 2400 \text{ m}$$

Thus, the length of wire = 4 × 2400 = 9600 m = 9.6 m

6. (a) Perimeter of △ ABC = AB + BC + CA

$$= 3 \text{ cm} + 4 \text{ cm} + 5 \text{ cm}$$

$$= 12 \text{ cm}$$
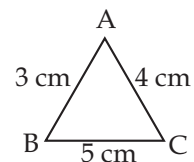
(b) Perimeter of △ ABC = 3 × Side

$$= 3 × (9) \text{ cm}$$

$$= 27 \text{ cm}$$
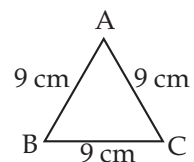
(c) Perimeter of △ ABC = AB + BC + CA

$$= 8 \text{ cm} + 6 \text{ cm} + 8 \text{ cm}$$

$$= 22 \text{ cm}$$
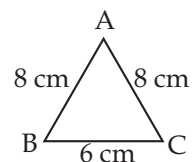
7. Perimeter of triangle = Sum of all 3 sides

$$= 10 \text{ cm} + 14 \text{ cm} + 15 \text{ cm}$$

$$= 39 \text{ cm}$$

Thus, perimeter of traingle = 39 cm

8. Perimeter of Hexagon = 6 × length of one side = 6 × 8 m = 48 m

Thus, the perimeter of hexagon is 48 m.

9. Perimeter of square = 4 × side

$$20 = 4 × \text{side}$$

$$\text{Side} = \frac{20}{4} = 5 \text{ m}$$

Thus, the side of square is 5 m.

10. Perimeter of a regular pentagon = 100 cm

$$5 × \text{side} = 100 \text{ cm}$$

$$\text{Side} = \frac{100}{5} = 20 \text{ cm}$$

Thus, the side of regular pentagon is 20 cm.

11. Length of string = Perimeter of each fig.

(a) Perimeter of square = 30 cm

$$4 × \text{side} = 30 \text{ cm}$$

$$\text{Side} = 7.5 \text{ cm}$$

(b) Perimeter of an equilateral triangle = 30 cm

$3 \times$ side = 30 cm

Side = $\dfrac{30}{3}$ = 10 cm

(c) Perimeter of a regular hexagon = 30 cm

$6 \times$ side = 30 cm

Side = $\dfrac{30}{6}$ = 5 cm

12. Let the third side of triangle = x cm

Perimeter of a triangle = 36 cm

12 cm + 14 cm + x cm = 36 cm

26 cm + x cm = 36 cm

x cm = 36 cm – 26 cm

x = 10 cm

Thus, the length of third side of triangle = 10 cm

13. Side of square = 250 m

Perimeter = $4 \times$ side = 4×250 = 1000 m

Since, cost of fencing of per meter = ₹ 20

∴ Cost of fencing of 1000 m = ₹ 20 × 1000 = ₹ 20,000

14. Length of rectangular park = 175 m

Breadth of rectangular park = 125 m

Perimeter = 2 (L + B) = 2 (175 + 125) = 2 × 300 = 600 m

The cost of fencing park of 1 m = ₹ 12

∴ The cost of fencing park of 600 m = ₹ 12 × 600 = ₹ 7200

15. Distance covered by Sweety = Perimeter of square park

= $4 \times$ side = 4×75 m = 300 m

Thus, the distance covered by Sweety = 300 m.

Distance covered by Bulbul = Perimeter of rectangular park

= 2 × (L + B) = 2 (60 + 45) m = 2 (105) m = 210 m

Thus, the distance covered by Bulbul = 210 m

And Bulbul covers less distance.

16. (a) Perimeters of square = $4 \times$ side

= 4×25 = 100 cm

(b) Perimeter of rectangular = 2 (L + B)

= 2 (20 + 30) cm = 2 (50) cm = 100 cm

(c) Perimeter of rectangle = 2 (L + B)

= 2 (40 + 10) cm = 2 (50) cm = 100 cm

(d) Perimeter of triangle = Sum of all sides

= (30 + 30 + 40) cm = 100 cm

Thus, all the figures have same perimeter.

17. (a) 6 m

(b) 10 m

(c) Second arrangement has greater perimeter.

(d) Yes, if all squares are arrangement in now, the perimeter be 10 cm.

EXERCISE-10.2

1. (a) Number of filled square = 9

∴ Area covered by squares = 9 × 1 = 9 sq. unit.

(b) Number of filled square = 5

∴ Area covered by squares = 5 × 1 = 5 sq. unit.

(c) Number of full filled square = 2

Number of half filled squares = 4

∴ Area covered by full squares = 2 × 1 = 2 sq. unit

∴ Area covered by half filled squares = $4 \times \dfrac{1}{2}$ = 2 sq. unit

∴ The total area = 2 + 2 = 4 sq. units.

(d) Number of filled square = 8

∴ Area covered by filled squares = 8 × 1 = 8 sq. unit.

(e) Number of filled square = 10

∴ Area covered by filled squares = 10 × 1 = 10 sq. units.

(f) Number of full filled squares = 2

Number of half filled squares = 4

∴ Area covered by full filled squares = 2 × 1 = 2 sq. units

and Area covered by half filled squares = $4 \times \dfrac{1}{2}$ = 2 sq. units

∴ Total area = 2 + 2 = 4 sq. units.

(g) Number of full filled squares = 4

Number of half filled squares = 4

∴ Area covered by full filled squares = 4 × 1 = 4 sq. units

and Area covered by half filled squares = $4 \times \dfrac{1}{2}$ = 2 sq. units

∴ Total area = 4 + 2 = 6 sq. units.

(h) Number of filled square = 5

∴ Area = 5 × 1 = 5 sq. units.

(i) Number of filled squares = 9

∴ Area = 9 × 1 = 9 sq. units.

(j) Number of full filled squares = 2

Number of half filled squares = 4

∴ Area of full filled squares = 2 × 1 = 2 sq. units

Area of half filled squares = $4 \times \dfrac{1}{2}$ = 2 sq. units

∴ Total area = 2 + 2 = 4 sq. units.

(k) Number of full filled squares = 4

∴ Area = 4 × 1 = 4 sq. units.

Number of half filled squares = 2

∴ Area = $2 \times \dfrac{1}{2}$ = 1 sq. units

∴ Total area = 4 + 1 = 5 sq. units.

(l) Number of full filled squares = 3

∴ Area = 3 × 1 = 3 sq. units.

Number of half filled squares = 10

∴ Area = $10 \times \dfrac{1}{2}$ = 5 sq. units.

∴ Total area = (5 + 3) = 8 sq. units.

(m) Number of full filled squares = 7

Area = 7 × 1 = 7 sq. units

Number of half filled squares = 14

Area = $14 \times \dfrac{1}{2}$ = 7 sq. units.

∴ Total area = 7 + 7 = 14 sq. units.

(n) Number of full filled squares = 10

Area = 10 × 1 = 10 sq. units.

Number of half filled squares = 16

Area = $16 \times \dfrac{1}{2}$ = 8 sq. units

∴ Total area = 10 + 8 = 18 sq. units.

EXERCISE-10.3

1. (a) Area of rectangle = L × B

= (3 × 4) cm^2 = 12 cm^2

(b) Area of rectangle = L × B

= 12 m × 21 m = 252 m^2

(c) Area of rectangle = L × B

= 2 km × 3 km = 6 km^2

(d) Area of rectangle = L × B

= 2m × 70 cm = (2 × 0.7) m^2 = 1.4 m^2

2. (a) Area of squares = side × side

= 10 cm × 10 cm = 100 cm^2

(b) Area of squares = side × side

= 14 cm × 14 cm = 196 cm^2

(c) Area of squares = side × side

= 5 m × 5 m = 25 m^2

3. (a) Area of rectangle = L × B

= 9 m × 6 m = 54 m^2

(b) Area of rectangle = L × B

= 17 m × 3 m = 51 m^2

(c) Area of rectangle = L × B

= 4 m × 14 m = 56 m^2

Thus, the part (c) has largest area = 56 m^2

The part (b) has smallest area = 51 m^2

4. Length of rectangular garden = 50 m

Area of rectangular garden = 300 m^2

Breadth $= \dfrac{\text{Area}}{\text{Width}} = \dfrac{300}{50} = 6$ m

Thus, the breadth of the garden = 6 m

5. Length of land = 500 m

Breadth of land = 200 m

∴ Area of land = L × B = (500 × 200) m^2 = 1,00,000 m^2

The cost of billing 100 m^2 of land = ₹ 8

The cost of billing 1,00,000 m^2 of land = ₹ $\dfrac{8}{100} \times 100000$ = ₹ 8,000

6. Length of table = 2 m

Breadth of table = 1 m 50 cm = 1.50 m

Area = L × B = 2 × 1.50 = 3 m^2

7. Length of room = 4 m

Breadth of room = 3 m 50 cm = 3.50 m

Area of carpet = L × B = 4 × 3.50 = 14 m^2

8. Length of floor = 5 m

Breadth of floor = 4 m

Area of floor = L × B = 5 × 4 = 20 m^2

Now, side of square carpet = 3 m

Area of square carpet = side × side = 3 × 3 = 9 m^2

Area of floor that is not carpet = 20 m^2 – 9 m^2 = 11 m^2

9. Side of square bed = 1 m

Area of square bed = side × side = 1 × 1 = 1 m^2

∴ Area of 5 square beds = 1 × 5 = 5 m^2

Now, Length of land = 5 m

Breadth of land = 4 m

∴ Area of land = L × B = 5 × 4 = 20 m^2

Area of remaining part = Area of land – Area of 5 flower beds

= 20 m^2 – 5 m^2 = 15 m^2

10. (a) Area of HKLM = 3 × 3 = 9 cm^2

Area of IJGH = 1 × 2 = 2 cm^2

Area of FEDG = 3 × 3 = 9 cm^2

Area of ABCD = 2 × 4 = 8 cm^2

Total area of the figure = (9 + 2 + 9 + 8) cm^2 = 28 cm^2
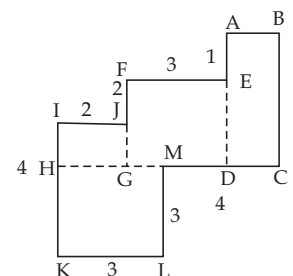
(b) Area of ABCD = 3 × 1 = 3 cm^2

Area of BEFG = 3 × 1 = 3 cm^2

Area of GHIJ = 3 × 1 = 3 cm^2

Total area of the figure = (3 + 3 + 3) cm^2 = 9 cm^2
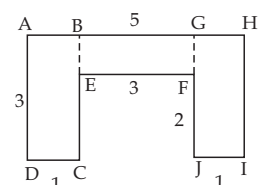
11. (a) Area of rec. ABCD = 2 × 10 = 20 cm^2

Area of rec. DEFG = 10 × 2 = 20 cm^2

Total area of the fig. = (20 + 20)

= 40 cm^2
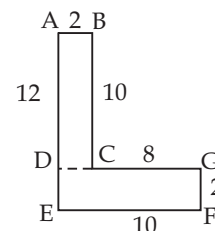
(b) There are 5 squares each of side 7 cm

Area of one square = 7 × 7 = 49 cm^2

Area of 5 square = 49 × 5 = 245 cm^2
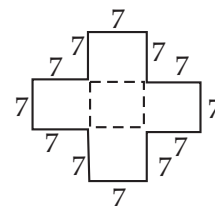
(c) Area of rec. ABCD = 5 × 1 = 5 cm^2

Area of rec. EFGH = 4 × 1 = 4 cm^2

Total area of the fig. = (5 + 4) cm^2

= 9 cm^2
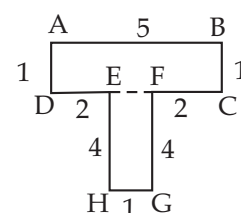
12. (a) Area of region = 100 cm × 144 cm = 14400 cm^2

Area of one tile = 5 cm × 12 cm = 60 cm^2

Number of tiles = $\dfrac{\text{Area of region}}{\text{Area of 1 tile}} = \dfrac{14400}{60}$ 240 tiles

Thus, 240 tiles are required.

(b) Area of region = 70 cm × 36 cm = 2520 cm2

Area of tile = 5 cm × 12 cm = 60 cm2

Number of tiles = $\dfrac{\text{Area of region}}{\text{Area of 1 tile}} = \dfrac{2520}{60} = 42$

Thus, 42 tiles are required.

SUBJECT ENRICHMENT EXERCISE

I. (1) $x + y + z$ **(2)** 2 (L + B)

(3) 5 × side   **(4)** Length × Breadth

(5) 424 m   **(6)** 2500 sq.cm

(7) All sides are equal   **(8)** 81 sq.cm

(9) Area ÷ Length   **(10)** 10,000 sq.cm

II. (1) Side

 (2) Length + Breadth

 (3) 26 cm

 (4) 21 cm
 (5) Area
 (6) Sq. units, linear units
 (7) 40 cm

III. (1) False   (2) True
 (3) True   (4) True
 (5) False   (6) False
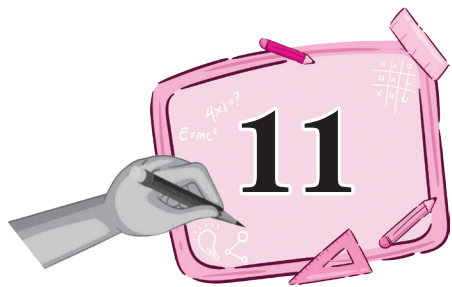
11 Algebra

EXERCISE-11.1

1. (a) 1, 3, 5, 7, 9, ..., $2n - 1$ for n^{th} arrangement
   (b) 5, 8, 11, 14, $3n + 2$ for n^{th} arrangement

2. (a) (i) 6, 11, 16
      6, (6 + 5), 6 + 5 × (2)
      (ii) One pattern have 6 matchsticks
      Second pattern have 6 matchsticks + 5 matchsticks that is 6 + 5 = 11
      Third pattern have 6 matchsticks + 2 time of 5 matchsticks that is 6 + 2 × 5 = 16
      (iii) For n^{th} shape = $5n + 1$
   (b) (i) 10, 17, 24 matchsticks
      (ii) First shape have 10 matchsticks
      Second shape have 10 matchsticks + 7 matchsticks, that is 10 + 7 = 17
      Third shape have 10 matchsticks + 2 time of 7 matchsticks, that is 10 + 7 (2) = 24
      (iii) For n^{th} shape = $7n + 3$

3. (a) 50, 63, 76, 89, _____
      The next number = 102   To find the next no., so, follow this pattern
      Rule - 50 = 50 $50 + 13(n)$, where n is a whole no.
      50 + 13 = 63
      63 + 13 = 76
      76 + 13 = 89
      89 + 13 = 102
   (b) 11, 22, 44, 88, _____   To find the next no., so, follow this pattern
      11 × 1 = 11 $11(n)$, where n is a natural no.
      11 × 2 = 22
      22 × 2 = 44
      44 × 2 = 88
      88 × 2= 176
      ∴ The next number = 176
   (c) 625, 125, 25, 5, _____
      The next number = 1 because each number is divided by 5.
      $$\frac{625}{5} = 125$$ Pattern is $\dfrac{n}{5}$

$$\frac{125}{5} = 25$$

$$\frac{25}{5} = 5$$

$$\frac{5}{5} = 1$$

(d) 2, 5, 8, 11, _____   Pattern $n + 3$

The next number = 14

4. (a) $v = u - 4$ (b) $s = 2x - 1$ (c) $m = 4f - 4$

5. (a)

a	5	6	7
b	25	36	49

(b)

X	2	3	1
W	6	8	4

6. (a) $n - 60$ (b) $\dfrac{n + 42}{13}$ (c) $24 - x$ (d) $\dfrac{18}{n}$

(e) $\dfrac{n}{3} + 54$ (f) $2n + 22$ (g) $y - 4$ (h) $\dfrac{n}{3} + 75$

(i) $5y - 6$ (j) $(n - 5)\,11$

7. Let the breadth of hall = Q m

Length of hall is 5 m more than twice its breadth i.e.

$L = 2Q + 5$

8. Let breadth of rectangle = b

Length of rectangle (l) = 2b – 2

When b = 5 cm

Then perimeter (p) = 2 (l + b) = 2 (8 + 5) = 26 cm

l = 2b - 2 = 2 (5) – 2 = 8

EXERCISE-11.2

1. Side of equilateral triangle = l

∴ Perimeter of equilateral triangle = 3 × side = 3 l

2. Side of regular hexagon = l

∴ Perimeter of regular hexagon = 6 × side = 6 l

3. Length of one cube = l

Number of edges in a cube = 12

∴ Total length = 12 × l = 12 l

4. Radius of circle = r units

Diameter of circle (d) = 2 × radius

∴ d = 2 r

5. 2n represents twice the number of students who like vanilla ice-cream, n/3 represents one-third of the students who like vanilla ice-cream.

EXERCISE-11.3

1. Volunteered water the school garden = y students

   The principal has wished 3 times as many volunteers

   ∴ The principal like to have volunteers = 3 x

   $y = 3x$

2. Let the total number of guests be y

   Gulab jamun = 12 + x

   Total people = Number of gulab jamuns brought

   $y = 12 + x$

3. Number of tofees in a bag = t

   Sister have tofees = 4 times as many tofees as a bag = 4 t

4. Let the number be x

   Then 6 x = 12

   $x = \dfrac{12}{6}$

   $x = 2$

5. Reeta's present age = x years

   Punya's age = $\dfrac{4}{5}$ of Reeta's age = $\dfrac{4}{5}$ x years

   Now,

   After 2 years Reets's age = $(x + 2)$ years

   After 2 years Punya's age = $\left(\dfrac{4}{5}x + 2\right)$ years

6. P = 15 x + 3

7. Jyoti's present age = x years

   Maya's present age = $(x + 3)$ years

   4 years ago, Jyoti's age = $x - 4$

   4 years ago, Maya's age = $x + 3 - 4 = x - 1$

8. Ali's present age = x years

   Lucky's present age = $4x$ years

   After 6 years Lucky's age = $(4x + 6)$ years

9. $\dfrac{x}{3} + 4$

EXERCISE-11.4

1. (a) It is an equation with variable x

   (b) It is not an equation

   (c) It is an equation with variable a

(d) It is not an equation

(e) It is an equation with variable a

(f) It is a numerical equation. It has no variable

(g) It is an equation with variable m

(h) It is an equation with variable p

2. (a) $x - 6 = 5$

When $x = 10$

$10 - 6 \neq 5$

$\therefore x = 10$ is not solution of the equation.

(b) $\dfrac{d}{6} = 4$, d = 24

When d = 24

$\dfrac{24}{6} = 4$

$\therefore d = 24$ is a solution of the equation.

(c) $17 - a = 5$, $a = 5$

When $a = 5$

$17 - 5 = 5$

$12 \neq 5$

$\therefore a = 5$ is not a solution of the equation.

(d) $3t - 5 = 46$, $t = 17$

When $t = 17$

$3(17) - 5 = 46$

$51 - 5 = 46$

$46 = 46$

$\therefore t = 17$ is a solution of the equation.

3. (a) $a + 12 = 23$

For $a = 1$, L.H.S = $1 + 12 + 13 \neq 23$, so, $a = 1$ is not a solution of equation

For $a = 2$, L.H.S = $2 + 12 \neq 23$, so, $a = 2$ is not a solution of equation

For $a = 3$, L.H.S = $3 + 12 \neq 23$, so, $a = 3$ is not a solution of equation

For $a = 11$, L.H.S = $11 + 12 = 23$, so, $a = 11$ is not a solution of equation

For $a = 12$, L.H.S = $12 + 12 \neq 24$, so, $a = 12$ is not a solution of equation

$\therefore a = 11$ is a solution of equation.

(b) $p - 16 = 36$

For $p = 1$, L.H.S = $1 - 16 \neq 36$, so, $p = 1$ is not a solution of equation

For $p = 2$, L.H.S = $2 - 16 = 36$, so, $p = 2$ is not a solution of equation

If we take $p = 52$

$p = 52$, L.H.S = $52 - 16 = 36 = $ R.H.S, so, $p = 52$ is a solution of equation

(c) $\dfrac{m}{8} = 8$

For $m = 1$, L.H.S = $\dfrac{1}{8} \neq 8$, so, $m = 1$ is not a solution of equation

For $m = 2$, L.H.S $= \dfrac{2}{8} \neq 8$, so, $m = 2$ is not a solution of equation and so on

If we take $m = 64$

The $\dfrac{64}{8} = 8 = $ R.H.S, so, $m = 64$ is a solution of equation

$\therefore$ $m = 64$ is a solution of equation

(d) $2n = 18$

For $n = 1$, $2(1) \neq 18$, so, $n = 1$ is not a solution of equation

For $n = 2$, $2(2) \neq 18$, so, $n = 2$ is not a solution of equation and so on

If we take $n = 9$

Then $2(9) = 18 = $ R.H.S. So, $n = 9$ is a solution of equation

4. (a) $x + 8 = 13$

(b) $\dfrac{39}{x} = 3$

(c) $3x - 5 = 40$

(d) $2(2x) = 40$

(e) $8(x + 5) = 48$

5. (a)

x	2	3	4	5
$x + 3$	5	6	7	8

Hence, $x = 4$ is the solution of the given equation $x + 3 = 7$

(b)

x	4	8	16	40
$n/8$	1/2	1	2	5

Hence, $x = 40$, is the solution of the given equation $n/8 = 5$

6. (a) $x - 6 = 4$

x	6	7	8	9	10	11
$x - 6 = 4$	0	1	2	3	4	5

$x - 6 = 4$

$x = 4 + 6 = 10$

(b) $y + 5 = 10$

y	1	2	3	4	5
$y + 5$	6	7	8	9	10

$y = 10 - 5$

$y = 5$

(c) $2m = 16$

m	1	2	3	4	5	6	7	8
$2m$	2	4	6	8	10	12	14	16

$2m = 16$

$$m = \frac{16}{2} = 8$$

$$m = 8$$

(d) $\dfrac{V}{2} = 9$

V	5	10	15	20	18
V/2	5/2	5	15/2	10	9

$$\therefore \frac{V}{2} = 9$$

$$V = 9 \times 2 = 18$$

NCERT CORNER

EXERCISE-11.1

1. (a) $2n$ (as 2 matchstick used in each letters)
   (b) $3n$ (as 3 matchstick used in each letters)
   (c) $3n$ (as 3 matchstick used in each letters)
   (d) $2n$ (as 2 matchstick used in each letters)
   (e) $5n$ (as 5 matchstick used in each letters)
   (f) $5n$
   (g) $6n$

2. The letter 'T' and 'V' that has pattern $2n$, since 2 matchsticks are used in all these letters.

3. Number of rows = n

   Cadets in each row = 5

   $\therefore$ Total number of cadets = $5n$

4. Number of boxes = b

   Number of mangoes in each box = 50

   $\therefore$ Total number of mangoes = 506

5. Number of students = s

   Number of pencils to each students = 5

   $\therefore$ Total number of pencils needed are = 5s

6. Time taken by bird = t minutes

   Speed of bird = 1 km/m

   $\therefore$ Distance covered by bird = speed × time = $1 \times t = t$ km

7. Number of dots in each row = 9 dots

   Number of rows = r

   $\therefore$ Number of dots = 9r

   When there are 8 rows, then number of dots = $8 \times 8 = 64$ dots

   When there are 10 rows, then number of dots = $8 \times 10 = 80$ dots

8. Radha's age = x years

   $\therefore$ Leela's age = $(x - 4)$ years

9. Number of laddus given away = l
   Number of laddus remaining = 5
   Total number of laddus = l + 5

10. Number of oranges in one box = x
    Number of boxes = 2
    ∴ Total number of oranges in boxes = $2x$
    Remaining oranges = 10
    Thus, number of oranges = $2x + 10$

11. (a) If we remove 1 from each then they makes table of 3, i.e, 3, 6, 9, 12,....
       So, the required eq = $3x + 1$, where x is number of squares.
       ☐ = 4 matchsticks
       ☐☐ = 7 matchsticks
       ☐☐☐ = 10 matchsticks
       ☐☐☐☐ = 13 matchsticks
    (b) △ = 3 matchsticks
       △▽ = 5 matchsticks
       △▽△ = 7 matchsticks
       △▽△▽ = 9 matchsticks
       If we remove 1 from each then they makes table of 2, i.e., 2, 4, 6, 8.....
       So, the required equation = $2x + 1$, where x is number of triangles.

EXERCISE-11.2

1. Side of equilateral triangle = l
   ∴ Perimeter of equilateral triangle = 3 × side = 3l

2. Side of hexagon = l
   ∴ Perimeter of Hexagon = 6 × side = 6l

3. Length of one edge of cube = l
   Number of edges in a cube = 12
   ∴ Total length = 12l

4. Since, length of diameter is double the length of radius
   ∴ d = 2r

5. $(a + b) + c = a + (b + c)$

EXERCISE-11.3

1. $(8 × 5) – 7$; $(8 × 7) – 5$; $(8 + 5) – 7$; $(8 + 7) – 5$; $5 × (7 + 8)$; $5 + (7 × 8)$; $5 + (8 – 7)$; $5 – (7 + 8)$

2. (c) and (d) parts are expressions with number only.

3. (a) Z + 1 = Addition
       Z – 1 = Subtraction
       Y + 17 = Addition
       Y – 17 = Subtraction

(b) 17 y = Multiplication

$\dfrac{y}{17}$ = Division

5z = Multiplication

(c) 2y + 17 = Multiplication and Addition

2y – 17 = Multiplication and Subtraction

(d) 7m = Multiplication

– 7m + 3 = Multiplication and Addition

– 7m – 3 = Multiplication and Subtraction

4. (a) P + 4   (b) p – 7   (c) 7p   (d) p/7

(e) – m – 7   (f) – 5p   (g) – p/5   (h) – 5p

5. (a) 2m + 11   (b) 2m – 11   (c) 5y + 3   (d) 5y – 3

(e) – 8y   (f) – 8y + 5   (g) 16 – 5y   (h) – 5y + 16

6. (a) (t + 4) ; (t – 4) ; (4 – t) ; 4t ; $\dfrac{t}{4}$; $\dfrac{4}{t}$

(b) 2y + 7 ; 2y – 7 ; 7y + 2 ; 7y – 2 and so on.

EXERCISE-11.4

1. (a) (i) y + 5   (ii) y – 3   (iii) 6y – 2   (iv) 6y

(v) 3y + 5

(b) Length = 36, Breadth = (36 – 4) m

(c) Height of box = h cm

Length of box = 5h cm

Breadth of box = (5h – 10) cm

(d) Meena's positions = s

Beena's position = s + 8

Leena's position = s – 7

Total number of steps = 4s – 10

(e) Speed of the bus = v km/h

Distance travelled in 5 hours = 5v km

Remaining distance = 20 cm

∴ Total distance = (5v + 20) km

2. (a) A book cost 3 times the cost of a notebook.

(b) The number of marbles in box is 8 times the marble on the table.

(c) Total number of students in the school is 20 times that in our class.

(d) Jaggu's uncle's age is 4 times the age of Jaggu.

Jaggu's aunt is 3 years younger than his uncle.

(e) The total number of dots is 5 times the number of rows.

3. (a) Munnu's age = x years

His younger brother is 2 years younger than time = (x – 2) years

His elder brother is 2 years more than his age = (x + 4) years

His father is 7 years more than thrice of his age = (3x + 7) years

(b) Her age in past = $(y - 3)$, $\left(y - 2\dfrac{1}{2} \right)$

Her age in future = $(y + 7)$, $\left(y + 4\dfrac{1}{2} \right)$

(c) Number of students like hockey is twice the students liking football i.e. 2n

Number of students like tennis is half the students like football i.e. n/2.

EXERCISE-11.5

1. (a) It is an equation with variable x.

(b) It is not an equation.

(c) It is a numerical equation.

(d) It is a numerical equation but it is false equation.

(e) It is an equation with variable x.

(f) It is an equation with variable x.

(g) It is not an equation.

(h) It is an equation with variable n.

(i) It is a numerical equation.

(j) It is an equation with variable p.

(k) It is an equation with variable y.

(l) It is not an equation.

(m) It is not an equation.

(n) It is an equation with no variable.

(o) It is an equation with variable x.

2. (a) No (b) Yes (c) No (d) No

(e) No (f) yes (g) No (h) No

(i) Yes (j) Yes (k) No (l) No

(m) No (n) No (o) No (p) No

(q) Yes

3. (a) $5m = 60$

Put $m = 10$

$5 (10) = 60$

$50 \neq 60$

LHS $\neq$ RHS

$\therefore m = 10$ is not the solution

Put $m = 5$

$5(5) = 60$

$25 \neq 60$

LHS $\neq$ RHS

$\therefore m = 5$ is not the solution

Put *m* = 12   Put *m* = 15

5(12) = 60   5(15) = 60

60 = 60   75 ≠ 60

LHS = RHS   LHS ≠ RHS

∴ *m* = 12 is a solution   ∴ *m* = 15 is not a solution

(b)

n + 12 = 20

Put *n* = 12

12 + 12 = 20

24 ≠ 20

LHS ≠ RHS

∴ *n* = 12 is not a solution

Put *n* = 8

8 + 12 = 20

20 = 20

LHS = RHS

∴ *n* = 8 is a solution

Put *n* = 20

20 + 12 = 20

32 ≠ 20

LHS ≠ RHS

∴ *n* = 20 is not a solution

Put *n* = 0

0 + 12 = 20

12 ≠ 20

LHS ≠ RHS

∴ *n* = 0 is not a solution

(c) *p* – 5 = 5 (0, 10, 5, – 5)

p	0	10	5	– 5
p – 5	– 5	5	0	– 10

∴ *p* = 10 is a solution

(d) $\dfrac{q}{7} = 7$ (7, 2, 10, 14)

q	7	2	10	14
$\dfrac{q}{2}$	$\dfrac{7}{2}$	1	5	7

∴ q = 14 is a solution

(e) r – 4 = 0 (4, – 4, 8, 0)

r	4	– 4	8	0
r – 4	0	– 8	4	– 4

∴ r = 4 is a solution

(f) x + 4 = 2 (– 2, 0, 2, 4)

x	– 2	0	2	4
x + 4	2	4	6	8

∴ x = – 2 is a solution

4. (a)

m	1	2	3	4	5	6	7	8	9	10	11	12	13
m + 10	11	12	13	14	15	16	17	18	19	20	21	22	23

∵ At m = 7, m + 10 = 16

∴ m = 6 is the solution

(b)

t	3	4	5	6	7	8	9	10	11	12	13	14	15	16
5t	15	20	25	30	35	40	45	50	55	60	65	70	75	80

∵ At t = 7, 5t = 35

∴ t = 7 is the solution

(c)

z	8	9	10	11	12	13	14	15	16	17	18	19	20
$\dfrac{z}{3}$	$2\dfrac{2}{3}$	3	$3\dfrac{1}{3}$	$3\dfrac{2}{3}$	4	$4\dfrac{1}{3}$	$4\dfrac{2}{3}$	5	$5\dfrac{1}{3}$	$5\dfrac{2}{3}$	6	$6\dfrac{1}{3}$	$6\dfrac{2}{3}$

∵ At z = 12, $\dfrac{z}{3} = 4$

∴ z = 12 is the solution

(d)

m	5	6	7	8	9	10	11	12	13	14	15
m – 7	– 2	– 1	0	1	2	3	4	5	6	7	8

∵ At m = 10, m – 7 = 3

∴ m = 10 is the solution

SUBJECT ENRICHMENT EXERCISE

I. (1) $10\,x$ (2) $6p - 8$

    (3) 6   (4) $(x + y) \div 5$

    (5) $4n$ (6) Distributive

II. (1) Linear equation

    (2) Literals or variable

    (3) $4 + y$

    (4) Constant, Variable

    (5) Algebraic expression

III. (1) True

    (2) True

    (3) False

    (4) True

    (5) True
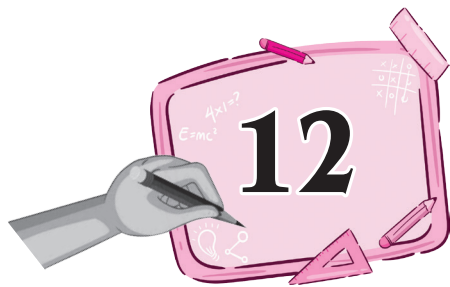
12 Ratio and Proportion

EXERCISE-12.1

1. (a) 6, 9

$$\therefore \text{Ratio} = \frac{\overset{2}{\cancel{6}}}{\underset{3}{\cancel{9}}} = \frac{2}{3} = 2 : 3$$

(b) 18, 36

$$\therefore \text{Ratio} = \frac{\overset{1}{\cancel{18}}}{\underset{2}{\cancel{36}}} = \frac{1}{2} = 1 : 2$$

(c) 14, 7

$$\therefore \text{Ratio} = \frac{\overset{2}{\cancel{14}}}{\underset{1}{\cancel{7}}} = \frac{2}{1} = 2 : 1$$

(d) 36, 8

$$\therefore \text{Ratio} = \frac{\overset{9}{\cancel{36}}}{\underset{2}{\cancel{8}}} = \frac{9}{2} = 9 : 2$$

(e) 96, 36

$$\therefore \text{Ratio} = \frac{\overset{8}{\cancel{96}}}{\underset{3}{\cancel{36}}} = \frac{8}{3} = 8 : 3$$

2. (a) Ratio of 8 kg to 400 g $= \dfrac{\overset{20}{\cancel{8000}}}{\underset{1}{\cancel{400}}} = \dfrac{20}{1} = 20 : 1$

(b) Ratio of 48 min to 1 hour
First we convert 1 hr into min
1 hr = 60 min

Ratio of 48 min to 60 min $= \dfrac{\overset{4}{\cancel{48}}}{\underset{5}{\cancel{60}}} = \dfrac{4}{5} = 4 : 5$

(c) 2 m to 35 cm
2 m = 200 cm

Ratio of 200 cm to 35 cm $= \dfrac{\overset{40}{\cancel{200}}}{\underset{7}{\cancel{35}}} = \dfrac{40}{7} = 40 : 7$

(d) 35 minutes to 45 seconds
1 min = 60 sec
35 min = 60 × 35 = 2100 sec

Ratio of 2100 sec to 45 sec $= \dfrac{\overset{140}{\cancel{\underset{\cancel{700}}{2100}}}}{\underset{\underset{3}{\cancel{15}}}{\cancel{45}}} = \dfrac{140}{3} = 140 : 3$

(e) 2 dozens to 3 scores

1 dozen = 12 things

2 dozen = 12 × 2 = 24 things

1 scores = 20 things

3 scores = 20 × 3 things = 60 things

Ratio of 2 dozen to 3 scores = $\dfrac{\overset{2}{\cancel{24}}}{\underset{5}{\cancel{60}}} = \dfrac{2}{5} = 2:5$

(f) 3 weeks to 3 days

1 week = 7 days

3 weeks = 3 × 7 = 21 days

Ratio of 3 weeks to 3 days = 21 days to 3 days = $\dfrac{\overset{7}{\cancel{21}}}{\underset{1}{\cancel{3}}} = \dfrac{7}{1} = 7:1$

(g) 48 min to 2 hrs 40 min

2 hrs = 120 min

2 hr + 40 min = 120 + 40 = 160 min

Ratio of 48 min to 160 min = $\dfrac{\overset{\overset{3}{24}}{\cancel{48}}}{\underset{\underset{10}{80}}{\cancel{160}}} = \dfrac{3}{10} = 3:10$

(h) 3 m 5 cm to 35 cm

3 m 5 cm = 3 m + 5 cm

300 cm + 5 cm = 305 cm

Ratio of 305 cm to 35 cm = $\dfrac{\overset{61}{\cancel{305}}}{\underset{7}{\cancel{35}}} = \dfrac{61}{7} = 61:7$

3. Number of girls = 20

Number of boys = 40

Total students = 20 + 40 = 60

(a) Ratio of number of girls to number of boys = $\dfrac{\overset{1}{\cancel{20}}}{\underset{2}{\cancel{40}}} = \dfrac{1}{2} = 1:2$

(b) Ratio of number of boys to total number of students = $\dfrac{\overset{2}{\cancel{40}}}{\underset{3}{\cancel{60}}} = \dfrac{2}{3} = 2:3$

4. (a) 3 : 4 or 9 : 16

Ratio of 3 : 4 = $\dfrac{3}{4} = \dfrac{3 \times 4}{4 \times 4} = \dfrac{12}{16}$

Ratio of 9 : 16 = $\dfrac{9}{16}$

$\dfrac{12}{16} > \dfrac{9}{16}$

$$\frac{3}{4} > \frac{9}{16}$$

∴ 3 : 4 > 9 : 16

(b) 15 : 16 or 24 : 25

Ratio of 15 : 16 = $\frac{15}{16}$

Ratio of 24 : 25 = $\frac{24}{25}$

LCM of 16 and 25 = 400

$$\frac{15 \times 25}{16 \times 25} = \frac{375}{400} \quad \text{or} \quad \frac{24 \times 16}{25 \times 16} = \frac{384}{400}$$

Clearly $\frac{375}{400} < \frac{384}{400}$

∴ $\frac{15}{16} < \frac{24}{25}$

∴ 15 : 16 < 24 : 25

(c) 4 : 7 or 5 : 8

$4 : 7 = \frac{4}{7}$ or $5 : 8 = \frac{5}{8}$

LCM of 7 and 8 = 56

$$\frac{4 \times 8}{7 \times 8} = \frac{32}{56} \quad \text{or} \quad \frac{5 \times 7}{8 \times 7} = \frac{35}{56}$$

Clearly $\frac{32}{56} < \frac{35}{56}$

∴ $\frac{4}{7} < \frac{5}{8}$

∴ 4 : 7 < 5 : 8

(d) 9 : 20 or 8 : 13

$9 : 20 = \frac{9}{20}$ or $8 : 13 = \frac{8}{13}$

LCM of 20 and 13 = 260

$$\frac{9 \times 13}{20 \times 13} = \frac{117}{260} \quad \text{or} \quad \frac{8 \times 20}{13 \times 20} = \frac{160}{260}$$

Clearly $\frac{117}{260} < \frac{160}{260}$

∴ $\frac{9}{20} < \frac{8}{13}$

∴ 9 : 20 < 8 : 13

5. Poonam earns = ₹ 955

Poonam saves = ₹ 185

Her expenditure = ₹ (955 − 185) = ₹ 770

(a) Ratio of her saving to her income = $\dfrac{\overset{37}{\cancel{185}}}{\underset{191}{\cancel{955}}} = \dfrac{37}{191} = 37 : 191$

(b) Ratio her saving to her expenditure = $\dfrac{\overset{37}{\cancel{185}}}{\underset{154}{\cancel{770}}} = \dfrac{37}{154} = 37 : 154$

6. (a) $\dfrac{15}{18} = \dfrac{\boxed{5}}{6} = \dfrac{\boxed{25}}{30}$

(b) $\dfrac{1}{7} = \dfrac{\boxed{5}}{35} = \dfrac{6}{\boxed{42}}$

(c) $\dfrac{6}{5} = \dfrac{\boxed{30}}{25} = \dfrac{60}{\boxed{50}}$

(d) $\dfrac{13}{15} = \dfrac{\boxed{26}}{30} = \dfrac{39}{\boxed{45}}$

7. Divide 102 into two parts such that 8 : 9

The two parts are 8 and 9

∴ The sum of the parts = 8 + 9 = 17

∴ Ist part = $\dfrac{8}{\underset{1}{\cancel{17}}} \times \overset{5}{\cancel{102}} = 48$

∴ IInd part = $\dfrac{9}{\underset{1}{\cancel{17}}} \times \overset{6}{\cancel{102}} = 54$

8. Ratio = 8 : 7

The sum of the ratio = 8 + 7 = 15

Sum of two number = 60

∴ Ist number is $\dfrac{8}{15}$ of 60 = $\dfrac{8}{\underset{1}{\cancel{15}}} \times \overset{4}{\cancel{60}} = 32$

∴ IInd number is $\dfrac{7}{15}$ of 60 = $\dfrac{7}{\cancel{15}} \times \overset{4}{\cancel{60}} = 28$

9. The sum of two angles = 90°

Ratio of these two angles = 2 : 3

The sum of ratio of these two angles = 5

∴ Ist angle = $\dfrac{2}{\underset{1}{\cancel{5}}} \times \overset{18}{\cancel{90}} = 36°$

∴ IInd angle = $\dfrac{3}{\underset{1}{\cancel{5}}} \times \overset{18}{\cancel{90}} = 54°$

10. The sum of the angle of a $\triangle$ = 180°

Ratio between them = 1 : 2 : 3

Sum of ratio = 1 + 2 + 3 = 6

$\therefore$ Ist angle = $\dfrac{1}{6}$ of 180° = $\dfrac{1}{\cancel{6}} \times \cancel{180}^{\,30}$ = 30°

$\therefore$ IInd angle = $\dfrac{2}{6}$ of 180° = $\dfrac{2}{\cancel{6}_{1}} \times \cancel{180}^{\,30}$ = 60°

$\therefore$ IIIrd angle = $\dfrac{3}{6}$ of 180° = $\dfrac{3}{\cancel{6}_{1}} \times \cancel{180}^{\,30}$ = 90°

11. Sum of money = ₹ 1200

Knak divides money into his two children in ratio 5 : 3

$\therefore$ Ist child get money = $\dfrac{5}{\cancel{8}_{1}^{\,\cancel{4}}} \times \cancel{1200}^{\,600}$ = ₹ 750

$\therefore$ IInd child get money = $\dfrac{3}{\cancel{8}_{1}} \times \cancel{1200}^{\,150}$ = ₹ 450

12. Two parts are 5 and 7

Sum = 5 + 7 = 12

$\therefore$ Sania's share = $\dfrac{5}{\cancel{12}_{1}} \times \cancel{1500}^{\,125}$ = ₹ 625

$\therefore$ Biju's share = $\dfrac{7}{\cancel{12}_{1}} \times \cancel{1500}^{\,125}$ = ₹ 875

13. Let the number of sunflower = x

Number of rose flower = $x + 35$

Sum of both flower = $(x) + (x + 35) = 2x + 35$

Ratio rose to sunflower = 8 : 3 = $\dfrac{8}{3}$

Number of rose flower = $\dfrac{8}{11} \times (2x + 35)$

$x + 35 = \dfrac{16x}{11} + \dfrac{280}{11} \Rightarrow \dfrac{16x}{11} - x = \dfrac{35 - 280}{11}$

$\Rightarrow \dfrac{5}{11}x = \dfrac{385 - 280}{11} \Rightarrow \dfrac{5}{11}x = \dfrac{105}{11}$

$x = \dfrac{\cancel{105}^{\,21}}{\cancel{11}} \times \dfrac{\cancel{11}}{\cancel{5}_{1}}$ = 21 flowers

Number of sunflowers = 21 flowers
Number of rose flowers = 21 + 35 = 56 flowers

<div align="center">**EXERCISE-12.2**</div>

1. (a) 3, 12, 5, 20

We have $3 : 12 = \dfrac{3}{12} = \dfrac{1}{4}$

and $5 : 20 = \dfrac{5}{20} = \dfrac{1}{4}$

∴ 3 : 12 = 5 : 20

Hence, 3, 12, 5, 20 are in proportion.

(b) 60 g : 50 g :: 180 l : 150 l

We have $60 \text{ g} : 50 \text{ g} = \dfrac{6\cancel{0}}{5\cancel{0}} = \dfrac{6}{5}$

$180 \text{ l} : 150 \text{ l} = \dfrac{\overset{6}{\cancel{180}}}{\underset{5}{\cancel{150}}} = \dfrac{6}{5}$

∴ 60 g : 50 g = 180 l : 150 l

Hence, 60 g : 50 g :: 180 l : 150 l are in proportion.

(c) 10, 20, 30, 40

We have $10 : 20 = \dfrac{10}{20} = \dfrac{1}{2}$

and $30 : 40 = \dfrac{30}{40} = \dfrac{3}{4}$

∴ 10 : 20 ≠ 30 : 40

Hence, 10, 20, 30, 40 are not in proportion.

(d) 20 kg : 80 kg and 25 gm : 625 gm

We have $20 \text{ kg} : 80 \text{ kg} = \dfrac{\overset{1}{\cancel{20}}}{\underset{4}{\cancel{80}}} = \dfrac{1}{4}$

and $25 \text{ gm} : 625 \text{ gm} = \dfrac{\overset{1}{\cancel{25}}}{\underset{25}{\cancel{625}}} = \dfrac{1}{25}$

∴ 20 kg : 80 kg ≠ 25 gm : 625 gm

∴ The given ratios do not form a proportion

2. (a) 7 : 14 = 15 : x

$\dfrac{7}{14} \diagdown\!\!\!\!\diagup \dfrac{15}{x}$

$7 \times x = 15 \times 14$

$x = \dfrac{15 \times \overset{2}{\cancel{14}}}{\cancel{7}} = 30$

(b) 15 : 60 = x : 20

$\dfrac{15}{60} \diagdown\!\!\!\!\diagup \dfrac{x}{20}$

$\dfrac{\overset{5}{\cancel{15}} \times \overset{1}{\cancel{20}}}{\underset{\underset{1}{\cancel{3}}}{\cancel{60}}} = x$

$x = 5$

(c) $x : 6 :: 55 : 11$

  $x : 6 = 55 : 11$

  $\dfrac{x}{6} = \dfrac{55}{11}$

  $x = \dfrac{\overset{5}{\cancel{55}} \times 6}{\underset{1}{\cancel{11}}}$

  $x = 30$

(d) $x : 92 = 87 : 116$

  $= \dfrac{x}{92} = \dfrac{87}{116}$

  $x = \dfrac{\overset{3}{\cancel{87}} \times \overset{\overset{23}{\cancel{46}}}{\cancel{92}}}{\underset{\underset{\underset{1}{29}}{58}}{\cancel{116}}} = 69$

  $x = 69$

3. Ratio of 9 to 150 $= \dfrac{9}{150} = \dfrac{3}{50} = 3 : 50$

  Ratio of 105 to 1350 $= \dfrac{\overset{\overset{7}{21}}{\cancel{105}}}{\underset{\underset{90}{270}}{\cancel{1350}}} = \dfrac{7}{90} = 7 : 90$

  Since, $3 : 50 \neq 7 : 90$

  $\therefore$ 9. 150, 105, 1350 are not in proportion.

4. Continued proportion means 2nd term is repeated

  $\therefore 4 : x :: x : 9$ are in continued proportion

  We have $4 : x = \dfrac{4}{x}$ and $x : 9 = \dfrac{x}{9}$

  $\dfrac{4}{x} = \dfrac{x}{9}$

  $x^2 = 9 \times 4 = 34$

  $x^2 = 36$

  $x \times x = 6 \times 6$

  Then $x = 6$

5. Ratio of 8 km to 36 km $= \dfrac{8}{36}$

  Let time he take to travel 36 km = x

  Ratio of 10 min to x min

  $\dfrac{8}{36} \diagdown \dfrac{10}{x}$

  $8 \times x = 10 \times 36$

  $x = \dfrac{\overset{5}{\cancel{10}} \times \overset{9}{\cancel{36}}}{\underset{\underset{\underset{1}{4}}{\cancel{8}}}{\cancel{8}}}$

  $x = 45$ min

  $\therefore$ He take to travel 36 km in 45 min

6. For 60 tickets, Poonam receives commission = ₹ 5

   For 96 tickets, Sony receives commission = $\dfrac{5 \times 96}{60}$ = ₹ 8

7. The given number are in proportion

   (a) 25, 35, x

   25 : 35 :: 35 : X

   $\dfrac{\overset{7}{\cancel{35}} \times \overset{7}{\cancel{35}}}{\underset{\underset{1}{\cancel{5}}}{\cancel{25}}} = x$

   $x = 7 \times 7 = 49$

   (b) x, 18. 54

   X : 18 :: 18 : 54

   $\dfrac{\cancel{18} \times \cancel{18}}{\underset{\cancel{27}}{\cancel{54}}}$

   $x = 6$

EXERCISE-12.3

1. In 25 days, a worker can earns = ₹ 4200

   In 1 day, a worker can earns = ₹ $\dfrac{4200}{25}$

   In 17 days, a worker can earns = ₹ $\dfrac{\overset{168}{\cancel{4200}}}{\underset{1}{\cancel{25}}} \times 17$ = ₹ 2856

   ∴ His income for 17 days is ₹ 2856

2. The cost of 30 pairs of gloves = ₹ 450

   The cost of 1 pairs of gloves = ₹ $\dfrac{\overset{15}{\cancel{45}\,\cancel{0}}}{\underset{1}{\cancel{30}}}$ = ₹ 15

   The cost of 16 pairs of gloves = ₹ 15 × 16 = ₹ 240

   ∴ The cost of 16 pairs of gloves is ₹ 240

3. Roshan travels 45 km in = 54 min

   Roshan travels 1 km in = $\dfrac{54}{45}$

   Roshan travels 70 km in = $\dfrac{\overset{6}{\cancel{54}}}{\underset{\underset{1}{\cancel{9}}}{\cancel{45}}} \times \overset{14}{\cancel{70}}$ = 84 min = 1 hr 24 min

   ∴ He takes 1 hr 24 min to travel 70 km

4. The cost 40 m of cloth = ₹ 200

The cost of 1 m of cloth = ₹ $\dfrac{\overset{5}{\cancel{200}}}{\underset{1}{\cancel{40}}}$ = ₹ 5

The cost of 50 m of cloth = ₹ 5 × 50 = ₹ 250

∴ The cost of 50 m of cloth = ₹ 250.

5. In ₹ 60, the number of bananas that can be purchased = 4 dozen = 4 × 12 = 48

In ₹ 1, the number of bananas that can be purchased = $\dfrac{48}{60}$

In ₹ 12.50, the number of bananas that can be purchased

$$= \dfrac{\overset{4}{\cancel{48}}}{\underset{5}{\cancel{60}}} \times \dfrac{12.50}{100} = \dfrac{\overset{2}{\cancel{4}}}{\underset{1}{\cancel{5}}} \times \dfrac{\overset{\overset{5}{\cancel{25}}}{\cancel{125}}}{\underset{\underset{1}{\cancel{2}}}{\cancel{10}}} = 10 \text{ bananas}$$

6. In 5 l of petrol, motorbike can travel = 220 km

In 1 l of petrol, motorbike can travel = $\dfrac{220}{5}$ km

In 1.5 l of petrol, motorbike can travel = $\dfrac{\overset{5}{\cancel{220}}}{\cancel{5}} \times \dfrac{\overset{3}{\cancel{15}}}{\cancel{10}}$ = 66 km

∴ The motorbike can travel 66 km in 1.5 l of petrol.

7. 52 packets of 12 pencil
Total pencil = 12 × 52 = 624
Now, 624 pencil costs = ₹ 499.20

1 pencil costs = $\dfrac{499.20}{624}$ = ₹ 0.80

Here 65 packets have 10 pencils each
So, that total pencil = 65 × 10 = 650 pencils
Now, if cost of 1 pencil = ₹ 0.80
The cost of 650 pencil = ₹ 0.80 × 650 = ₹ 520.00

8. Cost of 25 bags of wheat of each 40 kg = Rs 2250
Cost of (25 bags × 40 kg) = ₹ 2250
Cost of 1000 kg wheat = ₹ 2250

Cost of 1 kg wheat = ₹ = $\dfrac{\cancel{2250}}{\cancel{1000}}$ = ₹ 2.50

Cost of (35 bags × 50 kg) of wheat = $\dfrac{225}{\underset{2}{\cancel{100}}} \times 35 \times \overset{1}{\cancel{50}}$ = ₹ 3937.50

∴ Cost of 35 bags of wheat with weight 50 kg each = ₹ 3937.50.

9. (a) The weight of 72 books = 9 kg

The weight of 1 books = $\dfrac{9}{72}$

The weight of 80 books = $\dfrac{\cancel{9}^{1}}{\cancel{72}_{8}} \times \cancel{80}^{10} = 10$ kg

(b) Number of books weighing 9 kg = 72 books

Number of books weighing 1 kg = $\dfrac{72}{9}$

Number of books weighing 6 kg = $\dfrac{\cancel{72}^{\cancel{24}^{9}}}{\cancel{9}_{\cancel{3}_{1}}} \times \cancel{6}^{2} = 24 \times 2 = 48$ books

10. Let the salary be = x

$\dfrac{3}{4}$ of $x = 600$

$\dfrac{3}{4} \times x = 600$

$x = \cancel{600}^{200} \times \dfrac{4}{\cancel{3}_{1}} = ₹\, 800$

∴ His monthly salary is ₹ 800.

NCERT CORNER

EXERCISE-12 .1

1. (a) The ratio of girls to boys = $\dfrac{20}{15} = \dfrac{4}{3} = 4 : 3$

(b) The ratio of number of girls to the total number of students = $\dfrac{20}{20 + 15} = \dfrac{\cancel{20}^{4}}{\cancel{35}_{7}} = \dfrac{4}{7} = 4 : 7$

2. Total number of students = 30

Number of students like football = 6

Number of students like cricket = 12

Number of students like tennis = 30 − 6 − 12 = 12

(a) Ratio of number of students like football to number of students like tennis = $\dfrac{6}{12} = \dfrac{1}{2} = 1 : 2$

(b) Ratio of number of students like cricket to total number of students = $\dfrac{\cancel{12}^{2}}{\cancel{30}_{5}} = \dfrac{2}{5} = 2 : 5$

3. (a) Ratio of number of triangle to the number of circle = $\dfrac{3}{2} = 3 : 2$

(b) Ratio of number of squares to all figure = $\dfrac{2}{7} = 2 : 7$

(c) Ratio of number of circle to all figure = $\dfrac{2}{7} = 2 : 7$

4. Speed = $\dfrac{\text{Distance}}{\text{Time}}$

Speed of Hamid = $\dfrac{9\,\text{km}}{1\,\text{h}}$ = 9 km/h

Speed of Akhtar = $\dfrac{12\,\text{km}}{1\,\text{h}}$ = 12 km/h

Ratio of speed of Hamid to speed of Akhtar = $\dfrac{9}{12}$ = 3 : 4

5. $\dfrac{15}{18} = \dfrac{\boxed{5}}{6} = \dfrac{10}{\boxed{12}} = \dfrac{\boxed{25}}{30}$

Yes, there are equivalent ratios.

6. (a) Ratio of 81 to 108 = $\dfrac{\overset{3}{\cancel{81}}}{\underset{4}{\cancel{108}}} = \dfrac{3}{4}$ = 3 : 4

(b) Ratio of 98 to 63 = $\dfrac{\overset{14}{\cancel{98}}}{\underset{9}{\cancel{63}}} = \dfrac{14}{9}$ = 14 : 9

(c) Ratio of 33 km to 121 km = $\dfrac{\overset{3}{\cancel{33}}}{\underset{11}{\cancel{121}}} = \dfrac{3}{11}$ = 3 : 11

(d) Ratio of 30 min to 45 min = $\dfrac{\overset{2}{\cancel{30}}}{\underset{3}{\cancel{45}}} = \dfrac{2}{3}$ = 2 : 3

7. (a) Ratio of 30 min to 1.5 hr

1.5 hr = 1.5 × 60 = 90 min

Ratio of 30 min to 90 min = $\dfrac{\overset{}{\cancel{30}}}{\underset{3}{\cancel{90}}} = \dfrac{1}{3}$ = 1 : 3

(b) 1.5 m = 1.5 × 100 = 150 cm

Ratio of 40 cm to 1.5 m = 40 cm : 150 cm = $\dfrac{\cancel{40}}{\cancel{150}} = \dfrac{4}{15}$ = 4 : 15

(c) ₹ 1 = 100 paise

Ratio of 55 paise to ₹ 1 = 55 p : 100 p = $\dfrac{\overset{11}{\cancel{55}}}{\underset{20}{\cancel{100}}} = \dfrac{11}{20}$ = 11 : 20

(d) 2 l = 2 × 1000 ml = 2000 ml

Ratio of 500 ml to 2000 ml = $\dfrac{\overset{1}{\cancel{500}}}{\underset{4}{\cancel{2000}}} = \dfrac{1}{4}$ = 1 : 4

8. Total earning = ₹ 1,50,000

Saving = ₹ 50,000

∴ Money spent = 1,50,000 – 50,000 = ₹ 1,00,000

(a) Ratio of earning money to saved money = $\dfrac{\overset{3}{\cancel{150000}}}{\underset{1}{\cancel{50000}}} = \dfrac{3}{1} = 3 : 1$

(b) Ratio of money saving to money spend = $\dfrac{\overset{1}{\cancel{50000}}}{\underset{2}{\cancel{100000}}} = \dfrac{1}{2} = 1 : 2$

9. Ratio of number of teaches to number of students = $\dfrac{\overset{\overset{17}{\cancel{51}}}{\cancel{102}}}{\underset{\underset{550}{\cancel{1650}}}{\cancel{3300}}} = \dfrac{17}{550} = 17 : 550$

10. Total number of students in school = 4320

Number of girls = 2300

Number of boys = 4320 – 2300 = 2020

(a) Ratio of girls to total number of students = $\dfrac{\overset{115}{\cancel{2300}}}{\underset{216}{\cancel{4320}}} = \dfrac{115}{216} = 115 : 216$

(b) Ratio of number of boys to number of girls = $\dfrac{\overset{101}{\cancel{2020}}}{\underset{115}{\cancel{2300}}} = \dfrac{101}{115} = 101 : 115$

(c) Ratio of number of boys to the total number of students = $\dfrac{\overset{101}{\cancel{2020}}}{\underset{216}{\cancel{4320}}} = 101 : 216$

11. Total number of students = 1800

Number of students opted basketball = 750

Number of students opted cricket = 800

Number of students opted table tennis = 1800 – 750 – 800 = 250

(a) Ratio of number of students who opted basketball to number of students who opted table tennis = $\dfrac{\overset{3}{\cancel{750}}}{\underset{1}{\cancel{250}}} = 3 : 1$

(b) Ratio of students opted cricket to basketball = $\dfrac{\overset{16}{\cancel{800}}}{\underset{15}{\cancel{750}}} = \dfrac{16}{15} = 16 : 15$

(c) Ratio of students opted basketball to total number of students = $\dfrac{\overset{5}{\cancel{750}}}{\underset{12}{\cancel{1800}}} = \dfrac{5}{12} = 5 : 12$

12. Cost of 1 dozen pens (12 pens) = ₹ 180

Cost of 1 pen = $\dfrac{180}{12}$ = ₹ 15

Cost of 8 ball pens = ₹ 56

Cost of 1 ball pen = $\dfrac{56}{8}$ = ₹ 7

Ratio of the cost of a pen to the cost of a ball pen = $\dfrac{15}{7}$ = 15 : 7

13. Ratio of breadth to length = $2 : 5 = \dfrac{2}{5}$

∴ Other equivalent ratios are = $\dfrac{2}{5} \times \dfrac{10}{10} = \dfrac{20}{50}$; $\dfrac{2}{5} \times \dfrac{20}{20} = \dfrac{40}{100}$

Breadth (in m)	10	20	40
Length (in m)	25	50	100

14. Ratio between Sheel and Sangeeta = 3 : 2

Total these terms = 3 + 2 = 5

∴ part of Sheela = $\dfrac{3}{5}$ of the total pens

Sheels gets = $\dfrac{3}{5} \times 20$ = 12 pens

and part of Sangeeta = $\dfrac{2}{5}$ of the total pens

Sangeeta gets = $\dfrac{2}{5} \times 20$ = 8 pens

15. Ratio of the age of Shreya to the age of Bhoomika = $5 : 4 \left(\because \dfrac{15}{12} = \dfrac{5}{4} \right)$

Thus, ₹ 36 divide between Shreya and Bhoomika in the ratio of 5 : 4

Shreya gets = $\dfrac{5}{9}$ of Rs 36 = $\dfrac{5}{9} \times \overset{4}{\cancel{36}}$ = ₹ 20

Bhoomika gets = $\dfrac{4}{9}$ of ₹ 36 = $\dfrac{4}{9} \times \overset{4}{\cancel{36}}$ = ₹ 16

16. (a) Ratio of father's present age to the present age of son = $\dfrac{\overset{3}{\cancel{42}}}{\underset{1}{\cancel{14}}}$ = 3 : 1

(b) When son was 12 years, i.e., 2 years age, then father was = (42 – 2) = 40 years

∴ Ratio of age of father to age of son = $\dfrac{\overset{10}{\cancel{40}}}{\underset{3}{\cancel{12}}}$ = 10 : 3

(c) Age of father after 10 years = 42 + 10 = 52 years
Age of son after 10 years = 14 + 10 = 24 years

∴ Ratio of their ages = $\dfrac{\overset{13}{\cancel{52}}}{\underset{6}{\cancel{24}}} = \dfrac{13}{6}$ = 13 : 6

(d) When father was 30 years old, i.e., 12 years ago, then son was (14 – 12) = 2 years old

∴ The ratio of their ages = $\dfrac{30}{2} = \dfrac{15}{1}$ = 15 : 1

EXERCISE-12.2

1. (a) $15 : 45 = \dfrac{\overset{1}{\cancel{15}}}{\underset{3}{\cancel{45}}} = 1 : 3$

(b) $33 : 121 = \dfrac{\overset{3}{\cancel{33}}}{\underset{11}{\cancel{121}}} = 3 : 11$

$40 : 120 = \dfrac{\overset{1}{\cancel{40}}}{\underset{3}{\cancel{120}}} = \dfrac{1}{3} = 1 : 3$

$9 : 96 = \dfrac{\overset{3}{\cancel{9}}}{\underset{32}{\cancel{96}}} = \dfrac{3}{32} = 3 : 32$

Since, 15 : 45 = 40 : 120

∴ 15, 45, 40, 120 are in proportion.

Since, 3 : 11 ≠ 9 : 96

∴ 33, 211, 9, 96 are not in proportion.

(c) $24 : 28 = \dfrac{\overset{6}{\cancel{24}}}{\underset{7}{\cancel{28}}} = 6 : 7$

(d) $32 : 48 = \dfrac{\overset{2}{\cancel{32}}}{\underset{3}{\cancel{48}}} = 2 : 3$

$36 : 48 = \dfrac{\overset{3}{\cancel{36}}}{\underset{4}{\cancel{48}}} = 3 : 4$

$70 : 210 = \dfrac{\overset{1}{\cancel{70}}}{\underset{3}{\cancel{210}}} = 1 : 3$

Since, 24 : 28 ≠ 36 : 48

∴ 24, 28, 36, 48 are not in proportion.

Since, 32 : 48 ≠ 70 : 210

∴ 32, 48, 70, 210 are not in proportion

(e) $4 : 6 = \dfrac{\overset{2}{\cancel{4}}}{\underset{3}{\cancel{6}}} = 2 : 3$

(f) $33 : 44 = \dfrac{\overset{3}{\cancel{33}}}{\underset{4}{\cancel{44}}} = 3 : 4$

$8 : 12 = \dfrac{\overset{2}{\cancel{8}}}{\underset{3}{\cancel{12}}} = 2 : 3$

$75 : 100 = \dfrac{\overset{3}{\cancel{75}}}{\underset{4}{\cancel{100}}} = 3 : 4$

Since, 4 : 6 = 8 : 12

Therefore, 4, 6, 8, 12 are in proportion.

Since, 33 : 44 = 75 : 100

∴ 33, 44, 75, 100 are in proportion.

2. (a) 16 : 24 :: 20 : 30

$\dfrac{\overset{2}{\cancel{16}}}{\underset{3}{\cancel{24}}} = \dfrac{\overset{2}{\cancel{20}}}{\underset{3}{\cancel{30}}}$

$\dfrac{2}{3} = \dfrac{2}{3}$

Hence, it is true.

(b) 21 : 6 :: 35 : 10

$\dfrac{\overset{7}{\cancel{21}}}{\underset{2}{\cancel{6}}} = \dfrac{\overset{7}{\cancel{35}}}{\underset{2}{\cancel{10}}}$

$\Rightarrow \dfrac{7}{2} = \dfrac{7}{2}$

Hence, it is true.

(c) 12 : 18 :: 28 : 12

$\dfrac{\overset{2}{\cancel{12}}}{\underset{3}{\cancel{18}}} = \dfrac{\overset{7}{\cancel{28}}}{\underset{3}{\cancel{12}}}$

$\dfrac{2}{3} \neq \dfrac{7}{3}$

Hence, it is not true.

(d) 8 : 9 :: 24 : 27

$\dfrac{8}{9} = \dfrac{\overset{8}{\cancel{24}}}{\underset{9}{\cancel{27}}}$

$\dfrac{8}{9} = \dfrac{8}{9}$

Hence, it is true.

(e) 5.2 : 3.9 :: 3: 4

$$\frac{\overset{4}{\cancel{5.2}}}{\underset{3}{\cancel{3.9}}} = \frac{4}{3}$$

$$\frac{4}{3} \neq \frac{3}{4}$$

Hence, it is false.

(f) 0.9 : 0.36 :: 10 : 4

$$\frac{\overset{5}{\cancel{0.9}}}{\underset{2}{\cancel{0.36}}} = \frac{\overset{5}{\cancel{10}}}{\underset{2}{\cancel{4}}}$$

$$\frac{5}{2} = \frac{5}{2}$$

Hence, it is true.

3. (a) 40 persons : 200 persons = $\frac{40}{200} = \frac{1}{5} = 1 : 5$

₹ 15 : 75 = $\frac{\overset{1}{\cancel{15}}}{\underset{5}{\cancel{75}}} = 1 : 5$

Since, 40 persons : 200 persons = ₹ 15 : ₹ 75

Hence, the statement is true.

(b) 7.5 l : 15 l = $\frac{\overset{\overset{1}{\cancel{3}}}{\cancel{7.5}}}{\underset{\underset{2}{\cancel{6}}}{\cancel{150}}} = \frac{1}{2} = 1 : 2$

5 kg : 10 kg = $\frac{\overset{1}{\cancel{5}}}{\underset{2}{\cancel{10}}} = 1 : 2$

Since 7.5 l : 15 l = 5 kg : 100 kg

Hence, the statement is true.

(c) 99 kg : 45 kg = $\frac{\overset{11}{\cancel{99}}}{\underset{5}{\cancel{45}}} = 11 : 5$

₹ 44 : ₹ 20 = $\frac{\overset{11}{\cancel{44}}}{\underset{5}{\cancel{20}}} = \frac{11}{5} = 11 : 5$

Since, 99 kg : 45 kg = ₹ 44 : ₹ 20

Hence, the statement is true.

(d) 32 m : 64 m = $\frac{\overset{1}{\cancel{32}}}{\underset{2}{\cancel{64}}} = \frac{1}{2} = 1 : 2$

6 sec : 12 sec = $\frac{\overset{1}{\cancel{6}}}{\underset{2}{\cancel{12}}} = \frac{1}{2} = 1 : 2$

Since, 32 m : 64 m = 2 sec. : 12 sec.

Hence, the statement is true.

(e) 45 km : 60 km = $\dfrac{\overset{3}{\cancel{45}}}{\underset{}{\cancel{60}}}$ = 3 : 4

12 hr : 15 hr = $\dfrac{\overset{4}{\cancel{12}}}{\underset{6}{\cancel{15}}^{4}}$ = 4 : 5

Since, 45 km : 60 km ≠ 12 hr : 15 hr

Hence, the statement is not true.

4. (a) 25 cm : 1 m = 25 cm : 100 cm = $\dfrac{25}{100}$ = $\dfrac{1}{4}$ = 1 : 4

and ₹ 40 : ₹ 160 = $\dfrac{40}{160}$ = $\dfrac{1}{4}$ = 1 : 4

Hence 25 cm : 1 m and ₹ 40 : ₹ 160 are in proportion.

∴ Its middle terms are 100 and 40: extreme terms are 25 and 160.

(b) 39 l : 65 l = $\dfrac{\overset{3}{\cancel{39}}}{\underset{5}{\cancel{65}}}$ = 3 : 5

6 bottles : 10 bottles = $\dfrac{\overset{3}{\cancel{6}}}{\underset{5}{\cancel{10}}}$ = 3 : 5

Hence, 39 l : 65 l and 6 bottles : 10 bottles are in proportion.

Its middle terms are 65 and 6 ; Extreme terms are 39 and 10.

(c) 2 kg : 80 kg = $\dfrac{2}{80}$ = 1 : 40

and 25 g : 625 g = $\dfrac{\overset{1}{\cancel{25}}}{\underset{25}{\cancel{625}}}$ = 1 : 25

Hence, 2 kg : 80 kg and 25 g : 625 g are not in proportion.

(d) 200 ml : 2.5 l

200 ml : 2500 ml = $\dfrac{200}{2500}$ = 2 : 25

and ₹ 4 : ₹ 50 = $\dfrac{\overset{2}{\cancel{4}}}{\underset{25}{\cancel{50}}}$ = $\dfrac{2}{25}$ = 2 : 25

Hence, 200 ml : 2.5 l and ₹ 4 : ₹ 50 are in proportion.

∴ Its middle term = 2500 and 4

Extreme term = 200 and 50

EXERCISE-12.3

1. The cost of 7 m of cloth = ₹ 1470

The cost of 1 m of cloth = ₹ $\dfrac{1470}{7}$

The cost of 5 m of cloth = $\dfrac{\overset{210}{\cancel{1470}}}{\underset{1}{\cancel{7}}} \times 5$ = ₹ 1050

2. Ekta's earning of 10 days = ₹ 3000

Ekta's earning of 1 day = $\dfrac{3000}{10}$ = 300

Ekta's earning of 30 days = 300 × 30 = ₹ 9000

3. Rain in 3 days = 276 mm

Rain in 1 day = $\dfrac{276}{3}$

Rain in 7 days = $\dfrac{\overset{92}{\cancel{276}}}{\underset{1}{\cancel{3}}} \times 7$ = 92 × 7 = 644 mm

4. (a) Cost of 5 kg of wheat = ₹ 91.50

Cost of 1 kg of wheat = ₹ $\dfrac{91.50}{5}$

Cost of 8 kg of wheat = ₹ $\dfrac{\overset{183}{\cancel{91.50}}}{\underset{1}{\cancel{5} \times \cancel{100}}} \times 8 = \dfrac{183 \times 8}{10}$ = ₹ 146.4

(b) For ₹ 91.50, wheat purchased = 5 kg

For ₹ 1, wheat purchased = $\dfrac{5}{91.50}$

For ₹ 183, wheat purchased = $\dfrac{5 \times 100}{\underset{\underset{1}{183}}{\cancel{91.50}}} \times \overset{1}{\cancel{183}}$ = 10 kg

5. Degree of temperature dropped in last 30 days = 15°

Degree of temperature dropped in last 1 day = $\dfrac{15}{30} = \dfrac{1}{2}$

Degree of temperature dropped in last 10 days = $\dfrac{1}{2} \times 10$ = 5°

6. Rent paid for 3 months = ₹ 15000

Rent paid for 1 months = $\dfrac{15000}{3}$ = ₹ 5000

Rent paid for 12 months = ₹ 5000 × 12 = ₹ 60,000

7. Cost of 4 dozen bananas = ₹ 180

Cost of 1 dozen bananas = $\dfrac{\overset{\overset{5}{\cancel{104}}}{\cancel{180}}}{\underset{\underset{12}{\cancel{24}}}{\cancel{48}}}$ = ₹ 3.75

For ₹ 3.75, number of bananas purchased = 1

For ₹ 90, number of bananas purchased = 3.75 × 90 = ₹ 337.50

8. Weight of 72 books = 9 kg

Weight of 1 book = $\dfrac{9}{72}$

Weight of 40 books = $\dfrac{\cancel{9}^{1}}{\cancel{72}_{8}} \times \cancel{40}^{5} = 5\,\text{kg}$

9. For 594 km, diesel required = 108 l

For 1 km, diesel required = $\dfrac{108}{594}$

For 1650 km, diesel required = $\dfrac{\cancel{108}^{2}}{\cancel{594}_{11}} \times \cancel{1650}^{150} = 300\ \text{l}$

10. Raju purchase 10 pens for = ₹ 150

Raju purchase 1 pen for = ₹ $\dfrac{150}{10}$ = ₹ 15

Manish purchase 7 pens for = ₹ 84

Manish purchase 1 pen for = ₹ $\dfrac{\cancel{84}^{12}}{\cancel{7}}$ = ₹ 12

Thus Manish got the pens cheaper.

11. Anish made runs in 6 overs = 42 runs

Anish made runs in 1 overs = $\dfrac{42}{6}$ = 7 runs

Anup made runs in 7 overs = 63 runs

Anup made runs in 1 over = $\dfrac{63}{7}$ = 9 runs

Thus, Anup made more runs per over.

SUBJECT ENRICHMENT EXERCISE

I. (1) 5 : 12   (2) 4 : 3   (3) 4 : 9   (4) 16
   (5) 7   (6) 56

II. (1) Terms
   (2) Proportional
   (3) First term and fourth term
   (4) Second term and fourth term
   (5) Product, middle (means)

III. (1) False   (2) True   (3) True   (4) True
   (5) False   (6) True   (7) True
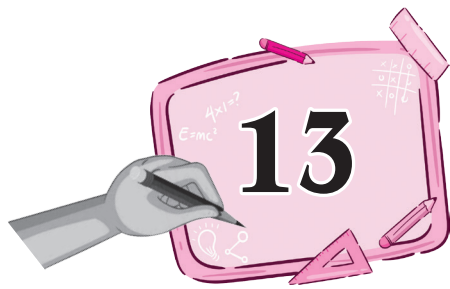
13 Symmetry

1. (a) This figure have lines of symmetry. This figure have two lines of symmetry.
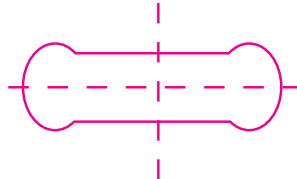
(b) This figure have lines of symmetry. This figure have one line of symmetry.
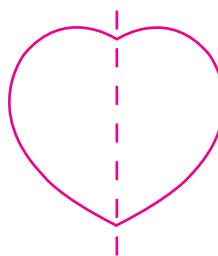
(c) This figure have no lines of symmetry.

(d) This figure have lines of symmetry. This figure have two lines of symmetry.
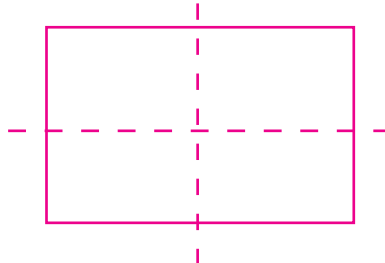
(e) This figure have six lines of symmetry.
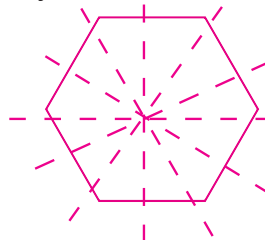
(f) This figure have three lines of symmetry.

2. (a)   (b)   (c)   (d)
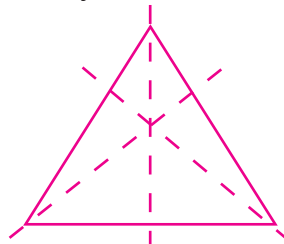
3. (a) A, B, C, D, E, K, M, T, U, V, W, and Y have only one line of symmetry.

    (b) H, I, O, X have two lines of symmetry.

    (c) F, G, J, L, N, O, R, S, and Z having no lines of symmetry.

    (d) Name of leaves which have at least one line of symmetry are:-

    • Sycomose

    • Ash

    • Birch

    • Horse cheshnut

    • Oak

4. Do it yourself

EXERCISE-13.2

1. (a) Two can be drawn. One vertical and one horizontal.

    (b) One can be drawn

    (c) One can be drawn

    (d) 5 can be drawn

2.
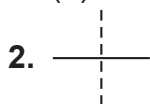
3. Do it yourself

4. N, R, S have no line of symmetry can be drawn.

5. (a) Scalene triangle can be drawn which no lines of symmetry.
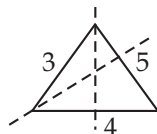
    (b) Isosceles triangle can be drawn which exactly one line of symmetry.
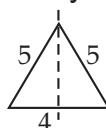
    (c) No triangle have exactly two lines of symmetry.

6. (a) Parallelogram is the quadrilateral having no line of symmetry.

    (b) Kite has one line of symmetry.

(c) Square has four lines of symmetry.

7.
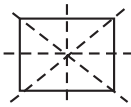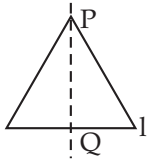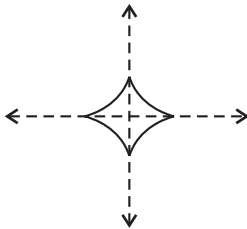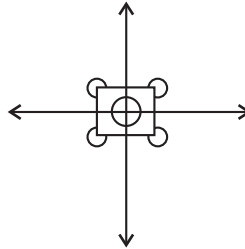
1. (a)   (b)   (c)
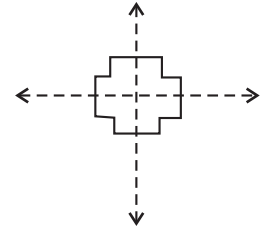
2. (a)   (b)
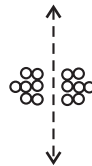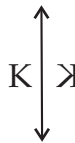
   (c)   (d)   (e)
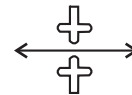
3. A, H, I, M, O, T, U, V, W, X, and Y

NCERT CORNER

EXERCISE-13.1

1. List of four symmetrical objects from home or school are

   (a) An electric tube

   (b) A glass

   (c) An electric bulb

   (d) A fan

2. From the given figure, clearly l_2 is the mirror line.

3. Fig (a), (b), (d), (e) and (f) are symmetrical and their lines of symmetry are shown as dotted lines.

   (a)   (b)   (c)

Mathematics-6

(d)

(e)

(f)
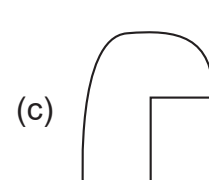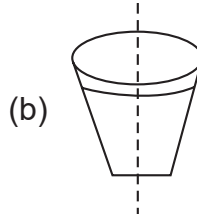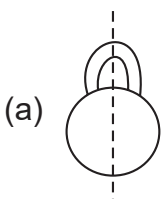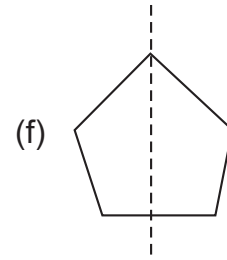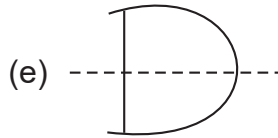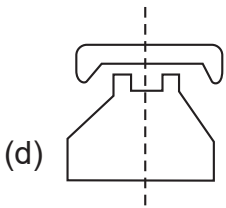
4. Do it yourself

5.
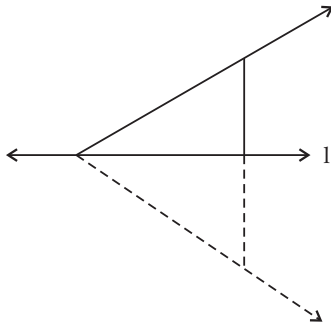
6.
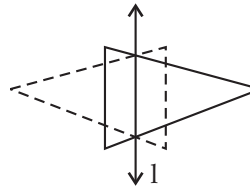
EXERCISE-13.2

1. (a) 4 lines of symmetry
   (b) 4 lines of symmetry
   (c) 4 lines of symmetry
   (d) 1 line of symmetry
   (e) 6 lines of symmetry
   (f) 6 lines of symmetry
   (g) Nil
   (h) Nil
   (i) 5 lines of symmetry

2. (a)   (b)

   (c)   (d)   No lines of symmetry.
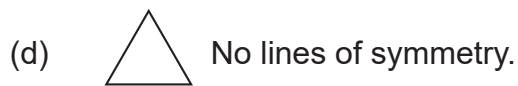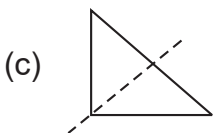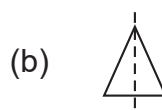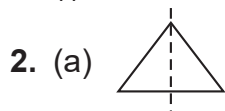
3. (ii) Square   Four
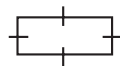
   (iii) Rectangle   Two

   (iv) Isosceles triangle   One
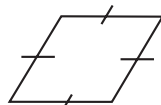
   (v) Rhombus   Two

   (vi) Circle   Infinite

4. (a) Yes, it is an isosceles triangle. Its rough sketch is as shown.

(b) No

(c) Yes, it is an equilateral triangle.
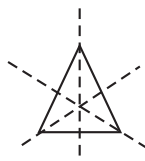
(d) Yes, it is a scalene triangle.

5. (a)

(b)

(c)

(d)

(e)

6. (a)

(b)

(c)

(d)

(e)

(f)
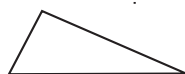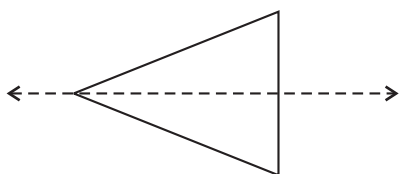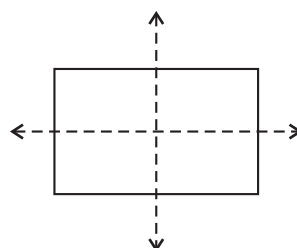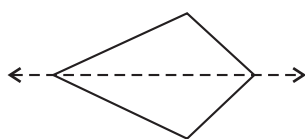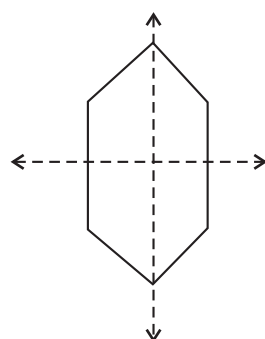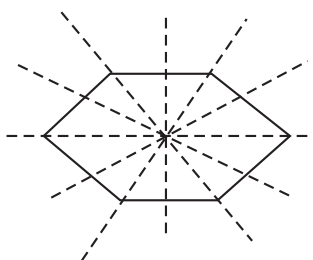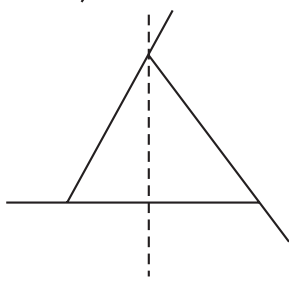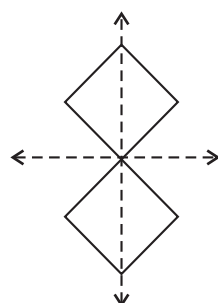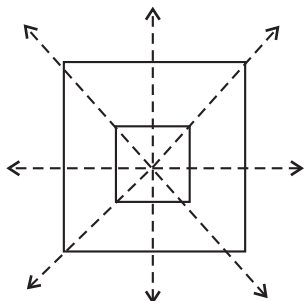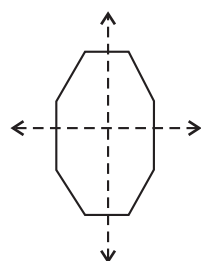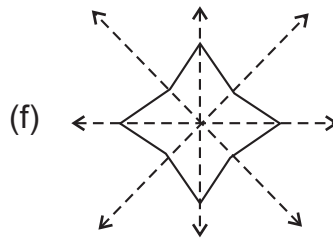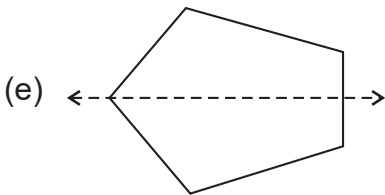
7. (a) Vertical lines of symmetry (like A) are A, H, I, M, O, J, U, V, W, X, and Y
   (b) Horizontal lines of symmetry (like B) are B, C, D, E, H, I, K, O and X.
   (c) No lines of symmetry (like Q) are F, G, J, L, N, P, Q, R, S, and Z.

8.

EXERCISE-13.3

1. By drawing the lines of symmetry, we find that the number of lines possessed by them are
   (a) Four lines of symmetry   (b) One line of symmetry
   (c) Two lines of symmetry   (d) Two lines of symmetry
   (e) One line of symmetry   (f) Two lines of symmetry

2. Do it yourself

3. Taking the mirror image of the letters A and B in the given line.

   Clearly, A after reflection looks same but B does not.
   It is due to the reason that the shape is preserved but sense is not.
   Out of the given letters:-
   O, M, N, H, T, V, and X looks as before after reflection, whereas E, P, L and S does not.

SUBJECT ENRICHMENT EXERCISE

I. (1) Vertical line of symmetry   (2) 1   (3) 3 line of symmetry   (4) 1
   (5) Infinite number of lines of symmetry

II. (1) Equal to the number of sides   (2) A line of symmetry
    (3) Coincides   (4) 4
    (5) 3   (6) No
    (7) 6   (8) 4
    (9) Infinite

III. (1) False   (2) True   (3) False   (4) False   (5) True   (6) False   (7) True
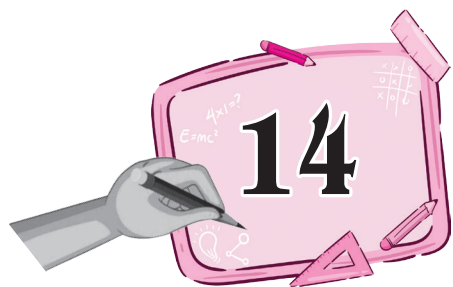
14 Practical Geometry

EXERCISE-14. 1
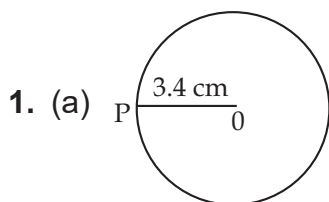
1. (a)

Steps of construction:-
1. Mark a point O on the paper.
2. Open the compasses for the required radius 3.4 cm.
3. Keep the steel end of the compasses fixed at the point O and rotate the pencil end at 3.4 cm distance from O till it returns to the starting point P.

Then, the figure so obtained is the required circle.

(b)

Steps of construction:-
1. Mark a point O on the paper.
2. Open the compasses for the required radius 5 cm.
3. Keep the steel end of the compasses fixed at the point O and rotate the pencil end at 5 cm distance from O till it returns to the starting point P.

Then, the figure so obtained is the required circle.
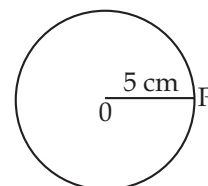
(c) **Steps of construction:-**
Same as above.
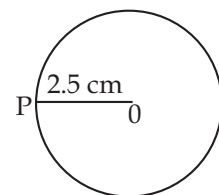
2. Steps of construction:-
1. Mark a point O on the paper.
2. Open the compasses for the radii 5 cm and 3 cm.
3. Keep the steel end of the compasses fixed at the point O and rotate the pencil end at 5 cm and 3 cm distance from O till it returns to their starting points respectively.

The circles obtained are the required circle.
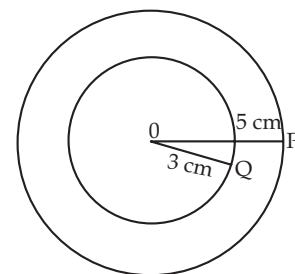
3.

PQ is a diameter of a circle

Length of $\overline{PQ}$ = 2 of radius = 2 × 3 = 6 cm

Length of $\overline{OB}$ = radius of the circle = 3 cm

Length of $\overline{OA}$ = 1.5 cm

Length of $\overline{OC}$ = 4.1 cm
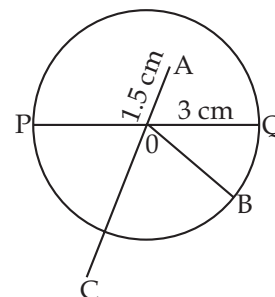
4.
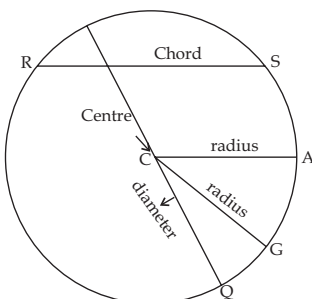
EXERCISE-14.2

1.

A——— 5.6 cm ———B
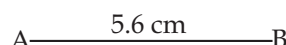
Steps of construction:-

1. Mark a point A on the plane of the paper and place the rules so that zero mark of the ruler is at A.

2. Mark with pencil a point B against the mark on the ruler which indicates 5.6 cm.

3. Join points A and B by moving the tip of the pencil against the straight edge of the ruler.

The line segment AB so obtained is the required line segment.

2.

← 6.3 cm → l
A   B
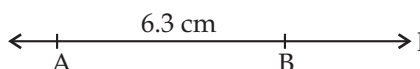
Steps of construction:-

1. Draw a line 'l'. Mark a point A on this line.

2. Place the compasses pointer on zero mark of the ruler. Open it to place the pencil point up to 6.3 cm mark.

3. Without changing the opening of the compasses. Place the pointer on A and cut and arc 'l' at B.

AB is the required line segment of length 6.3 cm.
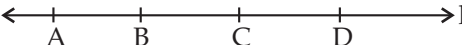
3. (a) Construct a line segment equal to (r + s)

← r   s → l
A   B   C
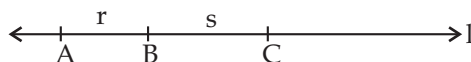
Step of construction:-

1. Draw a line 'l' using ruler and mark any point A on it.

2. Place the needle of the compasses on one point of $\overline{r}$ and open it equal to the length of the line segment r.

3. With the opening, set to the length of r line segment, place the needle of the compasses on point A and make a mark B where the other point of the compasses meets the ray.

4. Again open the compasses with equal length of line segment s.

5. With this opening, set to the length of s line segment place the needle of the compasses on point B and mark C where the other point of the compasses meet the ray.

AC is the required line segment.

(b)

$$\longleftarrow\ \overset{|}{\underset{A}{\ }}\ \ \overset{|}{\underset{B}{\ }}\ \ \ \overset{|}{\underset{C}{\ }}\ \ \ \overset{|}{\underset{D}{\ }}\ \longrightarrow l$$

Step of construction:-

1. Draw a line 'l' and mark a point A on it.

2. Open out the compasses in such way that the steel end is on one point of $\bar{r}$ and the pencil end is on other point of $\bar{r}$.

3. Transfer the compasses without disturbing their opening to the line l so that the steel end is on A.

4. With the pencil end, make a small stroke on the line l to cut it at the point B.

5. Repeat the step 3 and 4 with same opening having B as the initial point and C.

6. Repeat the step 3 and 4 again but length of compasses is equal to $\bar{s}$ with same opening

having c as the initial point and D as terminal point.

Then, the line segment AD = AB + BC + CD = r + r + s

AD = 2r + s

(c)

$$\longleftarrow\ \overset{|}{\underset{A}{\ }}\ \ \ \overset{|}{\underset{B}{\ }}\ \ \ \ \overset{|}{\underset{C}{\ }}\ \ \ \ \overset{|}{\underset{D}{\ }}\ \longrightarrow l$$

Step of construction:

1. Draw any line 'l' and mark a point A on it.

2. Using compass, find a point B so that AB = r on the line l.

3. Using compass, find a point C so that BC = s on the line l.

4. Using compass, find a point D so that CD = t on the line l.

5. Thus, AD = AB + BC + CD

= r + s + t

(d)

$$\longleftarrow\ \overset{|}{\underset{A}{\ }}\ \ \ \overset{|}{\underset{B}{\ }}\ \ \ \ \overset{|}{\underset{C}{\ }}\ \ \ \ \overset{|}{\underset{D}{\ }}\ \ \ \ \overset{|}{\underset{E}{\ }}\ \longrightarrow l$$

Step of construction:

1. Draw any line 'l' and mark a point A on it.

2. Using compass, find a point B so that AB = r on the line l.

3. Again using compass, find a point C so that BC = r on the line l.

4. Again using compass, find a point D so that CD = r on the line l.

5. Again using compass, find a point E so that DE = s on the line l.

6. Thus, AE = AB + BC + CD + DE

= r + r + r + s

= 3r + s

A ___ 3.5 cm ___ B   C ___ 4.2 cm ___ D

4.

$$\longleftarrow\ \overset{|}{\underset{X}{\ }}\ \ \ \overset{|}{\underset{D}{\ }}\ \ \ \ \overset{|}{\underset{Y}{\ }}\ \longrightarrow l$$
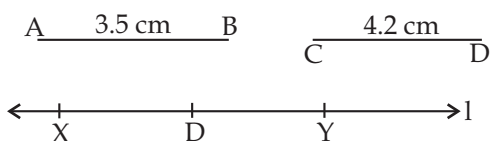
Steps of construction:
1. Draw a ling segment AB = 3.5 cm and CD = 4.2 cm
2. Draw a line l and make a point X on it.
3. Using compasses, find a point D on the line l so that $\overline{XD}$ = $\overline{AB}$ (i.e., 3.5 cm)
4. Using compasses, find a point Y so that $\overline{DY}$ = $\overline{CD}$ (i.e., 4.2 cm).

The $\overline{XY}$ so obtained is the required segment, whose length is equal to the sum of length $\overline{AB}$ length of $\overline{CD}$.

∴ Length of $\overline{XY}$ = Length of $\overline{AB}$ + Length of $\overline{CD}$.

5.

$$\underset{P}{\vdash}\ \overset{3.6\ cm}{}\ \underset{M}{\vdash}\ \overset{8\ cm}{}\ \overset{}{\underset{4.4\ cm}{}}\ \underset{Q}{\vdash}$$
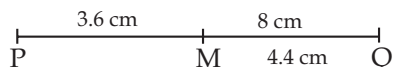
Steps of construction:
1. Draw a line segment PQ of length = 8 cm.
2. Using compasses, find a point C on the line segment PQ so that segment $\overline{PM}$ = 3.6 cm.
3. On measuring $\overline{MQ}$, we find that $\overline{MQ}$ = 4.4 cm

Verification = PQ = PM + MQ
8 cm = 3.6 cm + 4.4 cm
8 cm = 8.0 cm
L.H.S = R.H.S

∴ Length of $\overline{PQ}$ = Length of $\overline{PM}$ = Length of $\overline{MQ}$

EXERCISE-14.3

1. **Step of construction:**
   1. Draw a line segment AB using the ruler.
   2. Place the ruler such that its edge lies along the line AB.
   3. Hold the ruler firmly. Place the set-squares in contact with the ruler.
   4. Slide the set-square along the edge of the ruler, so that the vertical edge of the set square coincides with point C.
   5. Hold the set square firmly without changing its position. Draw a line along the edge of the set square joining C to D.

   CD is the required perpendicular line to the given line AB passing through point C. Here CD ⊥ AB.

   There are an infinite number of perpendicular lines can be drawn through a given line.

2.
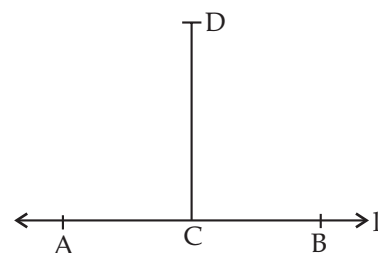
   Steps of construction:-
   1. Draw a line segment XY = 6 cm.
   2. Take a point Z on XY such that XZ = 3.5 cm.
   3. With centre Z and any radius, cut off AZ and ZB of equal lengths on both sides of Z.
   4. With centre A and any radius > AZ, drawn are.
   5. With centre B and the same radius, draw another arc, cutting the previously drawn are at C.
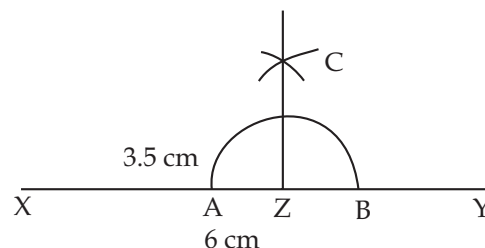
6. Join ZC

Then, the $\overline{ZC} \perp \overline{XY}$.

3. Steps of construction:-

1. Draw a line segment $\overline{DM}$ = 6.5 cm

2. With centre D and radius more than half the length of $\overline{DM}$, draw arcs one on each side of $\overline{DM}$.

3. With centre M and the same radius as before, draw arcs cutting the previously drawn are at A and B respectively.

4. Join AB intersecting DM at C. Then C bisects the $\overline{DM}$.

Then, AB is the perpendicular bisector of DM.

Length of each part = 3.25 cm

We observe that the C is the mid-point of DM such DC = CM. In other words $\overline{AB}$ is bisect $\overline{DM}$ in two equal parts.
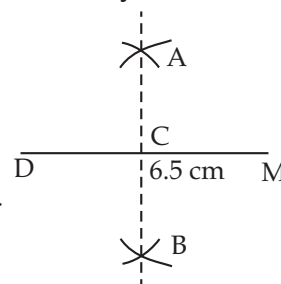
4. Steps of construction:-

1. Mark a point O on the plane of paper.

2. With O as centre, draw a circle of radius 6 cm.

3. Let AB and CD be any two chords of this circle.

4. Draw the perpendicular bisectors PQ and RS of chord AB and CD respectively.

Clearly, these perpendicular bisectors pass through O, the centre of the circle.
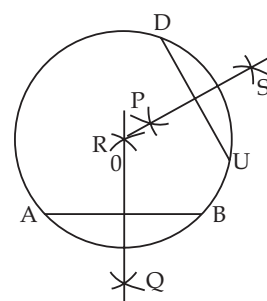
5. Steps of construction:-

1. Draw a circle with radius = 5 cm.

2. Draw a chord AB of the circle with centre O.

3. Now place the pointer of compass on point O and draw an arc XY on $\overline{AB}$ such that XY cut $\overline{AB}$ at X and Y.

4. With X as centre and radius > MX, draw an arc.

5. Now, taking Y as centre andsame radius, cut an arc such that it cuts the previously drawn arc at C.

6. Join MC

Length of $\overline{AM}$ = 4.3 cm and MB = 4.3 cm

∴ It shows that CM is perpendicular bisector of AB. If CM bisects AB in two equal parts i.e., AM = MB.
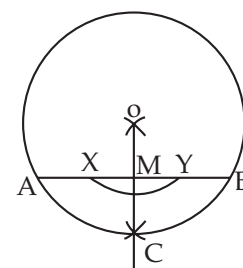
6. Steps of construction:-

1. Draw a line segment AB = 7 cm.

2. With centre A and radius > − AB, draw arcs one on each side of AB.

3. With centre B and the same radius as before, draw arcs cutting the previously drawn arcs at C and D respectively.

4. Join CD interesting AB at M.
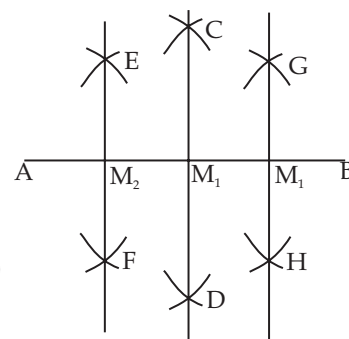
5. Further, find the mid-point M_1 and M_2 of MB and AM respectively proceeding in the same way as before.

∴ $AM_2 = M_2M = M = M_1 M_1B$.

EXERCISE-14.4

1. (a) 76°

   Step of construction:

   1. Draw a ray $\overrightarrow{BC}$

   2. With the help of protractor, construct ∠ABC = 76°.

   3. Taking centre B and any convenient radius, draw an arc which intersects the arms BC and AC at P and Q respectively.

   4. Taking P as centre and radius more than half of PQ, draw an arc.

   5. Taking Q as centre and with the same radius, draw another arc which intersects the previous at T.

   6. Join BT and produce it.

   Thus, BT is the required bisector of ∠ABC.
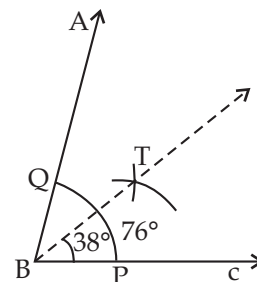
   (b) 125°

   Step of construction:-

   1. Draw a ray $\overrightarrow{OB}$

   2. With the help of protractor, construct ∠AOB = 125°.

   3. Taking centre O and any convenient radius, draw an arc which intersects the arms OB and OA at P and Q respectively.

   4. Taking P as centre and radius more than half of PQ, draw an arc.

   5. Taking Q as centre and with the same radius, draw another arc which intersects the previous at T.

   6. Join OT and produce it.

   Thus, OT is the required bisector of ∠AOB.
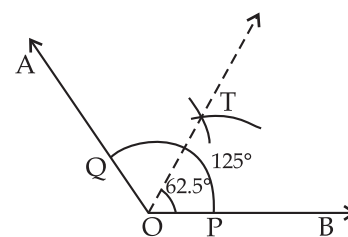
   (c) 68°

   Step of construction:-

   1. Draw a ray $\overrightarrow{OB}$

   2. With the help of protractor, construct ∠AOB = 68°.

   3. Taking centre O and any convenient radius, draw an arc which intersects the arms OB and OA at P and Q respectively.

   4. Taking P as centre and radius $> \dfrac{1}{2}$ PQ, draw an arc. Taking Q as centre and with the same radius, draw another arc which intersects the previous at T.

   5. Join OT and produce it.

   Thus, OT is the required bisector of ∠AOB.
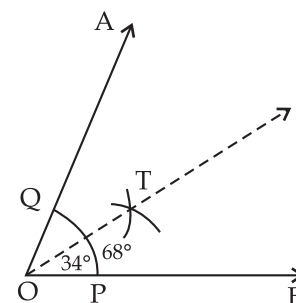
(d) 34°

Step of construction:-

1. Draw a ray $\overrightarrow{OB}$

2. With the help of protractor, construct $\angle AOB = 34°$.

3. Taking centre O and any convenient radius, draw an arc which intersects the arms OB and OA at P and Q respectively.

4. Taking P as centre and radius $> \dfrac{1}{2}$ PQ, draw an arc. Taking Q as centre and with the same radius, draw another arc which intersects the previous at T.

5. Join OT and produce it.

Thus, OT is the required bisector of $\angle AOB$.
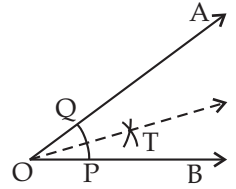
2. (a) 30°

Step of construction:-

1. Draw a ray $\overrightarrow{OB}$.

2. Taking O as centre and convenient radius, mark an arc, which intersect is $\overrightarrow{OB}$ at P.

3. Taking P as centre and same radius, cut previous arc at Q.

4. Join OQ, Thus $\angle AOB$ is required angle of 60°.

5. Put the pointer on P and mark an arc.

6. Put the pointer on Q and with same radius, cut the previous arc at C.

Thus, $\angle COB$ is required angle of 30°.
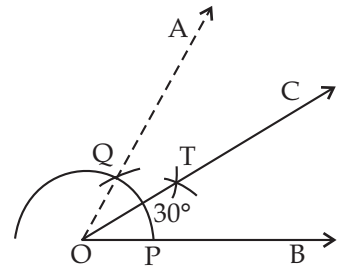
(b) 60°

Step of construction:-

1. Draw a ray $\overrightarrow{OA}$.

2. Taking O as centre and convenient radius, mark an arc, which intersect is $\overrightarrow{OA}$ at P.

3. Taking P as centre and same radius, cut previous arc at Q.

4. Join OQ,

Thus $\angle AOB$ is required angle of 60°.
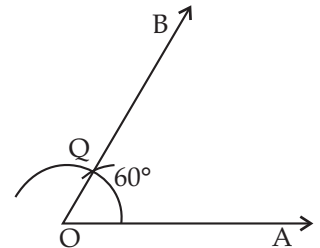
(c) 90°

Step of construction:-

1. Draw a ray $\overrightarrow{OA}$.

2. Taking O as centre and convenient radius, mark an arc, which intersect is $\overrightarrow{OA}$ at X.

3. Taking X as centre and same radius, cut previous arc at Y.

4. Taking Y as centre and same radius, draw another arc intersecting the same arc at Z.

5. Taking Y and Z as centres and same radius, draw two arcs intersecting each other at S.

6. Join OS and produce it to form a ray OB.

Thus, $\angle BOA$ is required angle of 90°.
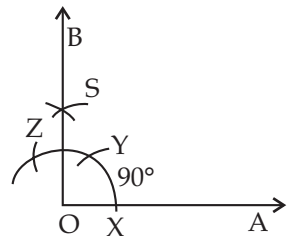
(d) 45°

Step of construction:-

1. Draw a ray $\overrightarrow{OA}$.

2. Taking O as centre and convenient radius, mark an arc, which intersect is $\overrightarrow{OA}$ at X.

3. Taking X as centre and same radius, cut previous arc at X.

4. Taking Y as centre and same radius, draw another arc intersecting the same arc at Z.

5. Taking Y and Z as centers and same radius, draw two arcs intersecting each other at S.

6. Join OS and produce it to form a ray OB. Thus, ∠AOB is required angle at 90°.

7. Draw the bisector of ∠BOA.

Thus ∠MOA is required angle of 45°.
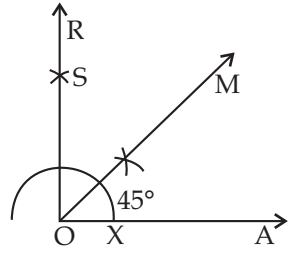
(e) 120°

Step of construction:

1. Draw a ray $\overrightarrow{OA}$.

2. Taking O as centre and convenient radius, mark an arc, which intersect is $\overrightarrow{OA}$ at P.

3. Taking P as centre and same radius, cut previous arc at Q.

4. Taking Q as centre and same radius cut the arc at S.

5. Join OS.

Thus, ∠AOD is required angle of 120°.
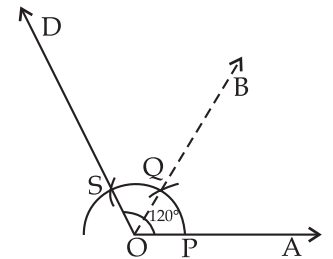
3. 1. Draw an angle 60° with protractor i.e., ∠POQ = 60°

2. Draw a ray $\overrightarrow{AB}$.

3. Place the compass to O and draw and arc to cut the rays of ∠POQ at L and M.

4. Use the same compass, setting to draw an arc with A as centre cutting AB at X.

5. Set your compasses setting to the length LM with the same radius.

6. Place the compass pointer at X and draw the arc to cut the arc drawn earlier at Y.

7. Join AY.

Thus, ∠YAX = 60°
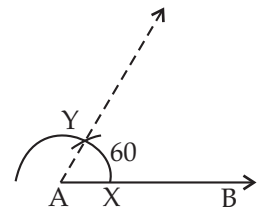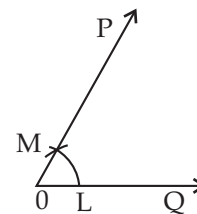
4. 1. Draw an angle 60° with protractor i.e., ∠POQ = 60°

2. Draw a ray $\overrightarrow{AB}$.

3. Place the compass to O and draw and arc to cut the rays of ∠POQ at L and M.

4. Use the same compass, setting to draw an arc with A as centre cutting AB at X.

5. Set your compasses setting to the length LM with the same radius.

6. Place the compass pointer at X and draw the arc to cut the arc drawn earlier at Y.
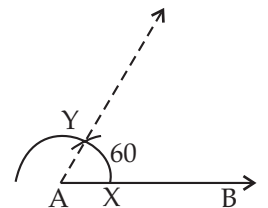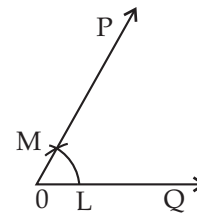
7. Join AY.

Thus, ∠YAX = 60°

5.
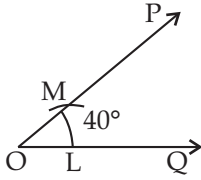
(a)
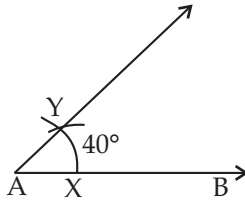
(b)
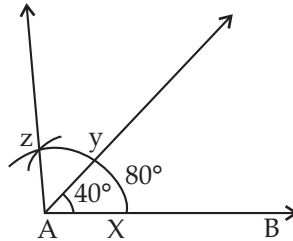
(c)
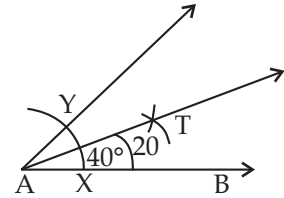
NCERT CORNER

EXERCISE-14.1

1. Steps of construction:-

   1. Mark a point O on the paper.

   2. Open the compass for the required radius = 3.2 cm.

   3. Keep the steel end of the compass fixed at the point O and rotate the pencil end at 3.2 cm distance from O till it returns to the starting point P.

   Then, the figure so obtained is the required circle.
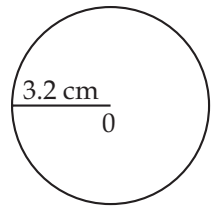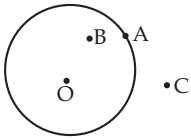

2. Steps of construction:-

   1. Mark a point O on the paper.

   2. Open the compass for the radii 4 cm and 2.5 cm.

   3. Keep the steel end of the compass fixed at the point O and rotate the pencil end at 4 cm and 2.5 cm distance from O till it returns to the starting point respectively..

   The circles obtained are the required circles.
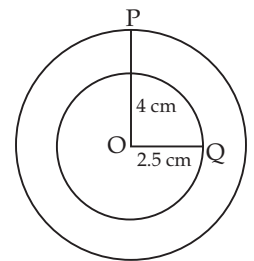
3. **Steps of construction:-**

   1. Draw a circle with O as centre of any radius.

   2. Draw any two diameters AOB and COD.

   3. Join AC, BD, CB and DA.

   Clearly. the figure ABCD is a rectangle.

   When diameters AOB and COD are perpendicular to each other. The figure obtained on joining AC, CB, BD and DA is a square ABCD.
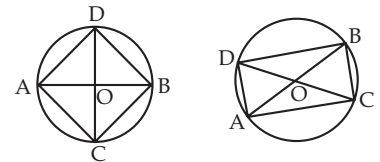
4.

5. **Steps of construction:-**

   1. Make points A and B on a paper such that AB = radii (i.e., 3 cm).
   2. With A as centre, draw a circle of any radius (3 cm).
   3. With B as centre, draw a circle of any radius (3 cm).
   4. Let these circle intersect at C and D.

   Clearly, on measuring, we find ∠AMC = 90° so AB ⊥ CD.
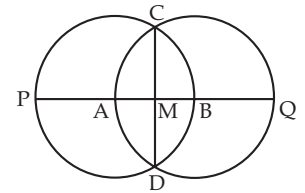
EXERCISE-14.2

1.   A├────── 7.3 cm ──────┤B

Steps of construction:-

1. Mark a point A on the plane of the paper and place the ruler so that zero mark of the ruler is at A.
2. Mark with pencil a point B against the mark on the ruler which indicates 7.3 cm.
3. Join points A and B with ruler.

The line segment AB so obtained is the required line segment.

2.   ←──── 5.6 cm ────→ l
         A   B

Steps of construction:-

1. Mark a point A on the plane of the paper and draw a line 'l' passing through A.
2. Place the steel end of the compass at 0 (zero) mark on the ruler and open out it such that the pencil end on the mark indicates 5.6 cm.
3. Transfer the compass as it is to the line l so that the steel end is on A.
4. With the pencil end mark a small stroke on l so to cut it at B.
5. The segment AB so obtained is the required line segment.

3. Steps of construction:-

   1. Draw a line segment AB = 7.8 cm.

   2. Using compass, find a point C on the $\overline{AB}$ so that segment AC = 4.7 cm.

   3. On measuring BC, we find that BC = 3.1 cm.
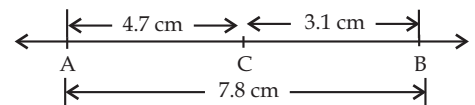
4. **Steps of construction:-**
   1. Draw a line l and make a point P on it.
   2. Using compass, find a point X so that PX (AB) = 3.9 cm on the line l.
   3. Using compass, find a point Q so that XQ = 3.9 cm on the line l.

   Thus PQ = PX + XQ = 3.9 cm + 3.9 cvm = 2 (3.9) cm = 2 AB
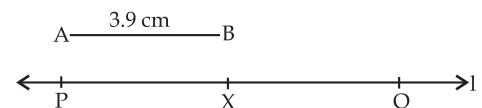
5. Steps of construction:-

1. Draw line segment AB = 7.3 and CD = 3.4 cm.

2. Draw a line l and make a point X on it.

3. Using compass, find a point P on the line l so that $\overline{XP} = \overline{AB} = 7.3$ cm.

4. Using compass, find a point Y so that the line segment PY = $\overline{CD}$ = 3.4 cm.

The $\overline{XY}$ so obtained is the required segment XY = XP – YP = AB – CD.

EXERCISE-14.3

1.
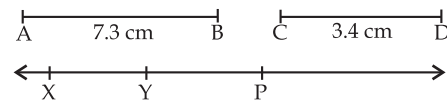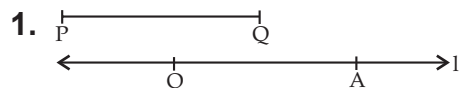
Steps of construction:-

Let PQ be the given line segment and l be a given line.

1. Mark a point O on the line l.

2. Open out the compass and adjust so the the steel end is on P and the pencil end is on Q.

3. Transfer the compass to the line l without disturbing their opening so that the steel end is on O.

4. With the pencil end, make a small stroke on the line l to cut it at the point A.

5. Then, the line segment OA so obtained = the given $\overline{PQ}$.

2.
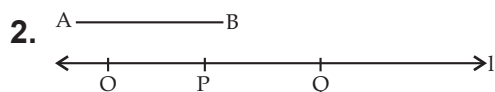
Steps of construction:-

Let AB be the given line segment.

1. Draw any line l and mark a point O on it.

2. Open out the compass in such way that the steel end is on A and the pencil end is on B.

3. Transfer the compass without disturbing their opening to the live l so that the steel end is on O.

4. With the pencil end, make a small stroke on the line l to cut it at the point P.

5. Repeat the step 3 and 4 with same opening having P as the initial point and Q as the terminal point.

Then, the segment OQ = DP + PQ = AB + AB = 2 AB.

EXERCISE-14.4

1. Steps of construction:-

1. Draw a line segment AB, and mark any point M on it.

2. With centre M and any radius, cut off MX and MY of equal lengths on both sides of M.

3. With centre X and any radius > MX, draw an arc.

4. With centre Y and the same radius, draw another arc, cutting the previously drawn arc at P.

5. Join MP

Then, the $\overline{PM}$ so obtained is the required perpendicular.
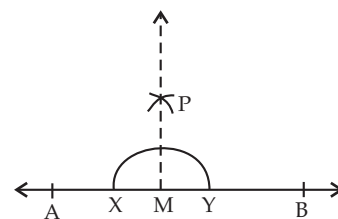
2. Steps of construction:-

1. Let PQ be the line and R is any point not lying on PQ.

2. Place the set square so that the base AB of the set square lies exactly on the line PQ.

3. Hold the set-square fixed and place a ruler so that its edge position lies along the side AC of the set-square.

4. Holding the ruler fixed, slide the set-square along the ruler till the point R coincides with the point B of the set-square.

5. Keeping the set square fixed in this position draw a line RT along the edge BC of the set-square through R.

Thus RT is the required perpendicular line to the line PQ passing through R.
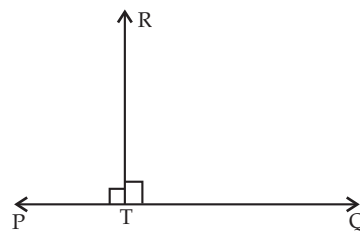
3.   Steps of construction:-

1. Draw a line l and mark any point X on it.

2. With centre X and any radius, cut off XA = XB on both sides of X.

3. With centre A and any radius > XA, draw an arc.

4. With centre B and the same radius draw another arc, cutting the previously drawn arc at Y.

5. Join XY. Then XY is perpendicular to line L.

6. By proceeding as above, draw a perpendicular YZ to XY.
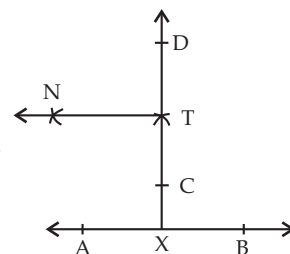
EXERCISE-14.5

1. Steps of construction:-

1. Draw a $\overline{AB}$ = 7.3 cm

2. With centre A and radius > $\dfrac{1}{2}$ AB, draw arcs one on each side of AB.

3. With centre B and the same radius as before, draw arcs cutting the previously drawn arc at C and D respectively.

4. Join CD intersecting AB at M. Then M bisects the $\overline{AB}$, as shown. The line segment so obtained is the required axis of symmetry.
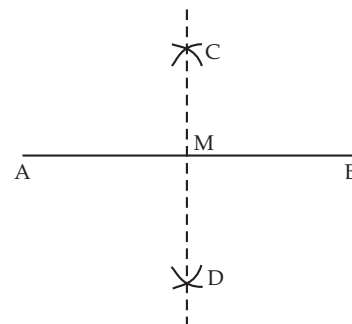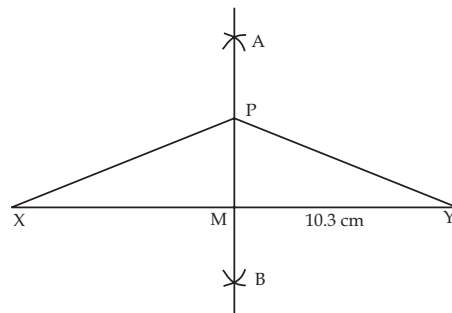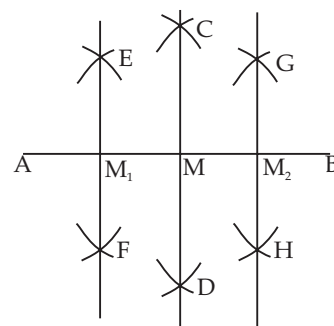
2. Steps of construction:-

1. Draw a line segment AB = 9.5 cm

2. With centre A and radius > $\dfrac{1}{2}$ AB, draw arcs one on each side of AB.

3. With centre B and the same radius as before, draw arcs cutting the previously drawn arcs at C and D respectively.

4. Join CD.
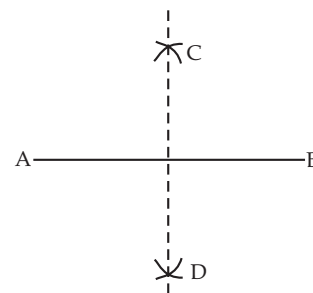
3. Steps of construction:-

1. Draw a $\overline{XY}$ = 10.3 cm

2. With centre X and radius > $\dfrac{1}{2}$ XY, draw arcs on each side of XY.

3. With centre Y and the same radius as before, draw arcs cutting the previously drawn arcs at A and B respectively.

4. Join AB intersecting XY at M.

Then, AB is the perpendicular bisector of XY.

5. Mark any point P on AB, the perpendicular bisector. On measuring we find that PX = PY.

6. M is the mid point of the segment XY,

$\therefore$ MX = $\dfrac{1}{2}$ XY = $\dfrac{1}{2}$ × 10.3 cm = 5.15 cm.

4. Steps of construction:-

1. Draw a $\overline{AB}$ = 12.8 cm.

2. With centre A and radius > $\dfrac{1}{2}$ AB, draw arcs one on each side of AB.

3. With centre B and the same radius as before, draw arcs cutting the previously drawn atcs to C and D respectively.

4. Join CD intersecting AB at M.

5. Further, find the mid-points M_1 and M_2 of AM and MB respectively proceeding in the same way as before.

$\therefore$ $AM_1 = M_1M = MM_2 = M_2B$. On measuring, we find that each part = 3.2 cm.

5. Steps of construction:-

1. Draw a line segment PQ = 6.1 cm.

2. Bisect the $\overline{PQ}$ by drawing its perpendicular bisector. Let M be its mid-point.

3. M as centre and radius = MP, draw a circle. The circle so obtained is the required circle.
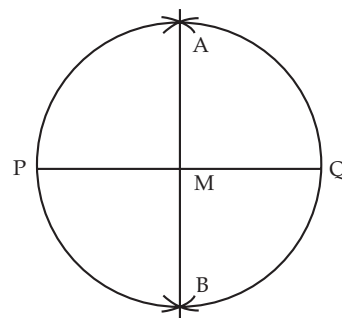
6. Steps of construction:-

1. Make a point C on the plane of a paper.

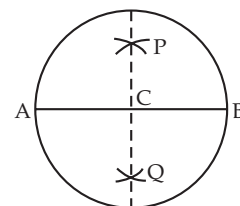2. With C as centre and radius 3.4 cm, draw a circle.

3. Let AB be any chord to this circle.

4. Draw PQ, the perpendicular bisector of chord AB. Clearly, this perpendicular bisector passes through C, the centre of the circle.
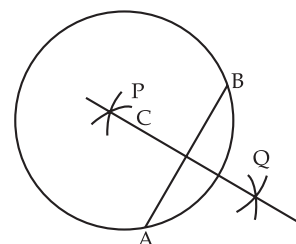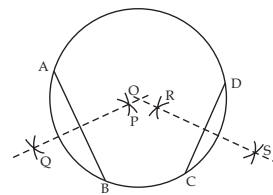
7. Steps of construction:-

If AB happens to be a diameter, then C will be the mid-points of the diameter AB.

8. Steps of construction:-

1. Make a point O on the plane paper.

2. With O as centre, draw a circle of radius 4 cm.

3. Let AB and CD be any two chords of this circle.

4. Draw the perpendicular bisectors PQ and RS of chords AB and CD respectively.

Clearly, these perpendiculars bisectors pass through O, the centre of the circle.

9. Steps of construction:-

1. Draw any angle XOY.

2. Take a point A on OX and a point B on OY such that OA = OB.

3. Draw Cd and EF, the perpendicular bisectors of OA and OB respectively. Let them meet at P.

On measuring, we find that PA = PB.
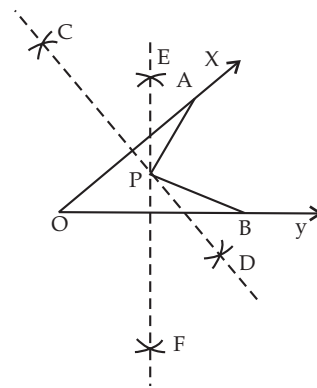
EXERCISE-14.6

1. Steps of construction:-

1. Draw a ray OP.

2. Draw $\angle PQR = 60°$ and $\angle POS = 90°$

3. Draw OQ, the bisector of $\angle ROS$.

Then, $\angle POQ = \angle POR + \dfrac{1}{2}\angle ROS$

$= 60° + \dfrac{1}{2}(\angle POS - \angle POR)$

$= 60° + \dfrac{1}{2}(90° - 60°)$

$= 60° + \dfrac{1}{2}(30°)$

$= 60° + 15° = 75°$, which is the required angle.
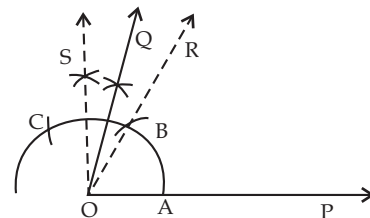
2. Steps of construction:-
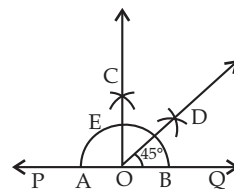
1. Draw a ray OA.

2. With the help of protractor, construct $\angle AOB = 147°$.

3. Taking centre O and any convenient radius, draw an arc which intersects the arms $\overline{OA}$ and $\overline{OB}$ at P and Q respectively.

4. Taking P as centre and radius more than half of PQ, draw an arc.

5. Taking Q as centre and with the same radius, draw another arc which intersects the previous at R.

6. Join OR and produce it.

Thus, $\overline{OR}$ is the required bisector of $\angle AOB$.
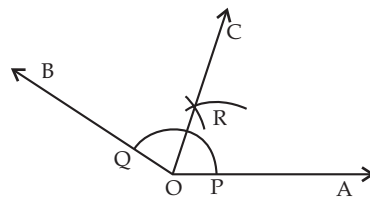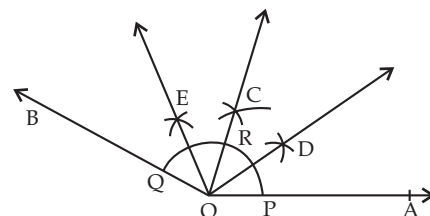
3. Steps of construction:-

1. Draw a line PQ and take a point O on it.

2. Taking O as centre and convenient radius, draw an arc which intersects PQ at A and B.

3. Taking A and B as centres and radius more than half of AB, draw two arcs which intersect each other at C.

4. Join OC. Thus, ∠COQ is the required right angle.

5. Taking B and E as centre and radius more than half of BE, draw two arcs which intersect each other at the point D.

6. Join OD.

Thus, $\overrightarrow{OD}$ is the required bisector of ∠COQ.
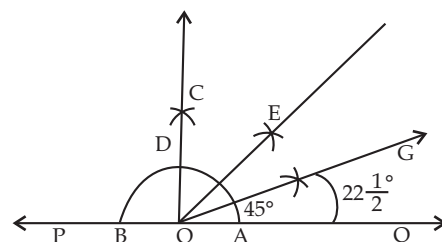
4. Steps of construction:-

1. Draw a ray $\overrightarrow{OA}$.

2. At O, with the help of a protractor, construct ∠AOB = 153°.

3. Draw $\overrightarrow{OC}$ as the bisector of ∠AOB.

4. Again, draw $\overrightarrow{OD}$ as the bisector of ∠AOC.

5. Again, draw $\overrightarrow{OE}$ as the bisector of ∠BOC.

6. Thus, $\overrightarrow{OC}$, $\overrightarrow{OD}$ and $\overrightarrow{OE}$ divide ∠AOB in four equal parts.

5. Same question in Ex. 14.4 in book exercise. See the solution of this question in Ex. 14.4 Q. 2.

6. Steps of construction:-

1. Draw a line PQ and take a point O on it.

2. Taking O as centre and a convenient radius, draw an arc which intersects PQ at two points A and B.

3. Taking A and B as centres and radius more than half of AB, draw two arcs which intersect each other at C.

4. Join OC. Then ∠COQ is an angle of 90°.

5. Draw $\overrightarrow{OE}$ as the bisector of ∠COE. Thus ∠QOE = 45°

6. Again draw $\overrightarrow{OG}$ as the bisector of ∠QOE.

Thus, $\angle QOG = \angle EOG = 22\dfrac{1}{2}$.
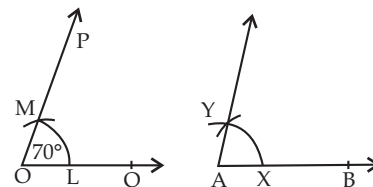
7. Steps of construction:-

1. Draw a line PQ and take a point O on it.

2. Taking O as centre and convenient radius, mark an arc, which intersects PQ at A and B.

3. Taking A and B as centers and radius more than — of AB, draw two arcs intersecting each other at R.

4. Join OR, Thus ∠QOR = ∠POQ = 90°

5. Draw $\overrightarrow{OD}$ the bisector of ∠POR. Thus ∠QOD = 135°

6. Now, draw $\overrightarrow{OE}$ as the bisector of ∠QOD.

Thus, $\angle QOE = \angle DOE = 67\dfrac{1}{2}$.
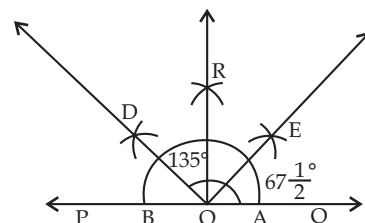
8. **Steps of construction:-**

1. Draw an angle 70° with protractor i.e., ∠POQ = 70°
2. Draw a ray $\overline{AB}$.
3. Place the compass at O and draw an arc to cut the rays of ∠POQ at L and M.
4. Use the same compass, setting to draw an arc with A as center, cutting AB at X.
5. Set your compass setting to the length LM with the same radius.
6. Place the compass pointer at X and draw the arc to cut the arc drawn earlier at Y.
7. Join AY.

Thus ∠YAX = 70°.

9. **Steps of construction:-**

1. Draw an angle of 40° with the help of protractor i.e., ∠AOB = 40°
2. Draw a line PQ.
3. Take any point M on PQ.
4. Place the compass at O and draw an arc to cut the rays of ∠AOB at L and N.
5. Use the same compass setting to draw an arc O as centre, cutting MQ at X.
6. Set your compass to length LN with the same radius.
7. Place the compass at X and draw the arc to cut the arc drawn earlier Y.
8. Join MY.

Thus, ∠QMY = 40° and ∠PMY is supplementary angle of it.
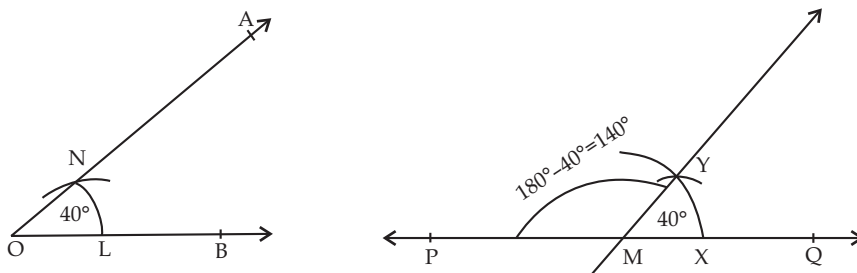
SUBJECT ENRICHMENT EXERCISE

I.
(1) Right angle
(2) Two equal parts
(3) Compass
(4) $\dfrac{\text{diameter}}{2}$
(5) 90°
(6) QR
(7) Infinite
(8) 1
(9) Infinite
(10) Compass and scale

II.
(1) Perpendicular bisector
(2) The unit of length
(3) Reflex angle
(4) A point
(5) Only one line
(6) Same/equal
(7) A line segment
(8) Line segment
(9) Length and direction
(10) Intersecting

III.
(1) False
(2) True
(3) True
(4) False
(5) False
(6) True
(7) False