गणित बूस्टर

(Teacher's Manual) Class-6

CLASS-6
Revision

1. (a) 9 (b) 36 (c) 95 (d) 104 (e) 230 (f) 690 (g) 944 (h) 966 (i) 3610 (j) 3590

2. (a) One crore fifty three lakh twenty six thousand seven hundred ninety seven (b) Seven hundred ninety two thousand six hundred eighty five. (c) Nine lakh fifty seven thousand two hundred eleven (d) Fifty one lakh seven hundred thirty one thousand two hundred seventeen

3. (a) 900000000 + 60000000 + 8000000 + 900000 + 30000 + 2000 (b) 90000000 + 8000000 + 900000 +1 (c)100000000 + 40000000 + 5000000 + 800000 + 30000 + 7000 +400 + 30 + 2 (d) 50000000 + 3000000 + 500000 + 10000 + 7000 + 800 + 20 + 4

4. (a) 7222022 (b) 48,97,32,521 (c) 30203 (d) 80074002

5. **Ascending order :**
   (a) 9234, 34125, 114721, 114723
   (b) 965256, 34725018, 34725112, 34725118 (c) 3251, 43213, 43216, 73215, 7934517 (d) 2356317, 3147327, 3148732, 5321981

6. **Descending order :**
   (a) 9234182, 9234181, 9234071, 347018 (b) 573259049, 573258048, 573258018
   (c) 347312, 347212, 347118
   (d) 923257090, 93247089, 92347089

7. Smaller number = 5 6 7 0 8 9 8
   Difference number = + 2 4 5 6 7 8
   Other number = 5 9 1 6 5 7 6

8. Shekhar had money = 97254208
   Invested in shares = – 2456789
   The amount he has now = 94797419

9. Number of passengers carried by a bus = 64
   Number of buses = 4567
   Passengers can travel in 4567 buses
   = 4567 × 64

   ```
          4 5 6 7
        ×   6 4
      1 8 2 6 8
    2 7 4 0 2 ×
    2 9 2 2 8 8
   ```

10. The cost of 120 bags of rice
    = ₹292800
    Quantity in 1 bag = 80 kg
    Total quantity in 120 bag = 120 × 80

    ```
        1 2 0
      ×   8 0
        0 0 0
      9 6 0 ×
      9 6 0 0
    ```

    Cost of 1 kg of rice
    = ₹ 292800 ÷ 9600

    ```
    9600)292800(30.5
         28800
         48000
         48000
             0
    ```

11. **Add the following :**
    (a)
    ```
      1 0 0 0 0 0 0 7 3
          3 2 6 7 9 2 4
    +         4 2 5 3 2
      1 0 3 3 1 0 5 2 9
    ```

    (b)
    ```
        5 1 9 6 7 5 1 2
        4 2 3 7 8 5 6
    +   9 3 7 0 0 2 4
        6 5 5 7 5 3 9 2
    ```

12. Subtract the following :

(a) 90000000 (b) 324982317
   $-\ 32408232$ $-\ \ 8679200$
   $\overline{57591768}$ $\overline{316303117}$

13. Simplify :

(a) $30 \div 6 + 10 - 2 \times 5$
   Using bodmas
   $= 5 + 10 - 10 = 15 - 10 = 5$

(b) $52 \div 13 \times 5 - 17 + 10$
   Using bodmas
   $= 4 \times 5 - 17 + 10$
   $= 20 - 17 + 10 = 30 - 17 = 13$

(c) $(10 \times 8) \div (20 \div 5)$
   Using bodmas
   $= 80 \div 4 = 20$

(d) $(18 + 10) - (3 \times 6)$
   Using bodmas
   $= 28 - 18 = 10$

(e) $\{20 + (15 + 5)\} - 5$
   Using bodmas
   $= \{20 + 20\} - 5 = 40 - 5 = 35$

(f) $\{(18 + 17) \div 5\} \div 7$
   Using bodmas
   $= \{35\} \div 5 \div 7 = 7 \div 7 = 1$

14. Find the H.C.F of the following numbers :

(a) $910, 1155$

$910\overline{)1155}(1$
    910
   $\overline{245)910}(3$
     735
   $\overline{175)245}(1$
     175
   $\overline{70)175}(0$
     140
   $\overline{35)70}(2$
     70
     $\overline{\ \ 0}$

Last divisor is 35
So the H.C.F is $= 35$

(b) $2150, 3340, 1945$
First we shall take 1945 and 2150

$1945\overline{)2150}(1$
   1945
  $\overline{205)1945}(9$
    1845
  $\overline{100)205}(2$
    200
   $\overline{5)100}(20$
    100
    $\overline{\ \ 0}$

Now, $5\overline{)3340}(668$
   30
  $\overline{\ 34}$
   30
  $\overline{\ 40}$
   40 Last divisor = 5
  $\overline{\ \ 0}$ So, H.C.F = 5

(c) $279, 186$

$186\overline{)279}(1$
   186
  $\overline{93)186}(2$
   186
  $\overline{\ \ 0}$

Last divisor = 93
So, H.C.F = 93

(d) $828, 1932$

$828\overline{)1932}(2$
   1656
  $\overline{276)828}(3$
   828
  $\overline{\ \ 0}$

Last divisor is = 276
So, H.C.F = 276

15. Find the L.C.M of the following number :

(a)

2	288, 96
2	144, 48
2	72, 24
2	36, 12
2	18, 6
3	9, 3
3	3, 1
	1, 1

L.C.M $= 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$
$= 32 \times 9 = 288$

(b)

5	10, 15, 20, 25
5	2, 3, 4, 5
3	2, 3, 4, 1
2	2, 1, 4, 1
2	1, 1, 2, 1
	1, 1, 1, 1

L.C.M $= 5 \times 5 \times 3 \times 2 \times 2 = 300$

(c)

5	480, 960, 720
3	96, 192, 144
3	32, 64, 48
2	32, 64, 16
2	16, 32, 8
2	8, 16, 4
2	4, 8, 2
2	2, 4, 1
2	1, 2, 1
	1, 1, 1

L.C.M. $= 5 \times 3 \times 3 \times 2 \times 2 \times 2 \times 2 \times 2 = 2880$

(d)

3	46, 24
2	46, 8
2	23, 4
2	23, 2
23	23, 1
	1, 1

L.C.M $= 3 \times 2 \times 2 \times 2 \times 23 = 552$

16.

3	150, 180
3	50, 60
2	50, 20
2	25, 10
5	25, 5
5	5, 1
	1, 1

L.C.M $= 3 \times 3 \times 2 \times 2 \times 5 \times 5 = 900$

17. Subtract 2 from both the numbers
$62 - 2 = 60, 227 - 2 = 225$

Now,

$$60\overline{)225}(3$$
$$\underline{180}$$
$$45\overline{)60}(1$$
$$\underline{45}$$
$$15\overline{)45}(3$$
$$\underline{45}$$
$$\underline{0}$$

Last divisor = 15
So, H.C.F = 15

18. 1566, 2030

$$1566\overline{)2030}(1$$
$$\underline{1566}$$
$$464\overline{)1566}(3$$
$$\underline{1392}$$
$$174\overline{)464}(2$$
$$\underline{348}$$
$$116\overline{)174}(1$$
$$\underline{116}$$
$$58\overline{)116}(2$$
$$\underline{116}$$
$$\underline{0}$$

We can also find by using this.
HCF × LCM =
1st number × 2nd number
Last divisor is = 58
So, H.C.F = 58
By using this, we can check the answer.
H.C.F × L.C.M = 1st number × 2nd number
$58 \times 54810 = 1566 \times 2030$
$3178980 = 3178980$

19. **Write as mixed fractions :**

(a) $\dfrac{820}{12} =$

$$12\overline{)820}(68$$
$$\underline{72}$$
$$100$$
$$\underline{96}$$
$$4$$

∴ Dividend

$= $ Quotient $\times \dfrac{\text{Remainder}}{\text{Divisor}} = 68\dfrac{4}{12}$

(b) $\dfrac{551}{18} =$

$$18\overline{)551}(30$$
$$\underline{54}$$
$$11$$

$= 30\dfrac{11}{18}$

20. Reduce the following to the simplest form :

(a) $\dfrac{108 \div 2}{96 \div 2} = \dfrac{54 \div 2}{48 \div 2} = \dfrac{27 \div 3}{24 \div 3}$

$= \dfrac{9}{8} = 1\dfrac{1}{8}$

(b) $\dfrac{315 \div 5}{135 \div 5} = \dfrac{63 \div 9}{27 \div 9} = \dfrac{7}{3} = 2\dfrac{1}{3}$

(c) $\dfrac{162 \div 3}{243 \div 3} = \dfrac{54 \div 3}{81 \div 3} = \dfrac{18 \div 3}{27 \div 3}$

$\dfrac{6 \div 3}{9 \div 3} = \dfrac{2}{3}$

21. Find the sum :

(a) $\dfrac{5}{18} + \dfrac{2}{14}$

L.C.M of 18, 14 and 126.

$= \dfrac{35 + 18}{126} = \dfrac{53}{126}$

(b) $\dfrac{1}{4} + \dfrac{3}{5}$

L.C.M of 4, 5 is 20.

$= \dfrac{5 + 12}{20} = \dfrac{17}{20}$

(c) $5\dfrac{1}{2} + 4\dfrac{3}{4} = \dfrac{11}{2} + \dfrac{19}{4}$

$= \dfrac{22 + 19}{4} = \dfrac{41}{4} = 10\dfrac{1}{4}$

(d) $9\dfrac{4}{10} + 4\dfrac{4}{10} + 7\dfrac{4}{10}$

Denominator are same so, L.C.M will be 10.

$= \dfrac{94}{10} + \dfrac{44}{10} + \dfrac{74}{10}$

$= \dfrac{94 + 44 + 74}{10} = \dfrac{212}{10} = 21\dfrac{2}{10} = 21\dfrac{1}{5}$

(e) $\dfrac{4}{15} + \dfrac{8}{12} + \dfrac{2}{4}$

L.C.M of 15, 12, 4 is 60.

$= \dfrac{16 + 40 + 30}{60} = \dfrac{86}{60}$

$= \dfrac{43}{30} = 1\dfrac{13}{30}$

(f) $\dfrac{8}{9} + \dfrac{5}{12} + \dfrac{7}{18}$

L.C.M of 9, 12, 18 is 36.

$= \dfrac{32 + 15 + 14}{36} = \dfrac{61}{36}$

22. (a) 1.2 $\boxed{>}$ 1.095

(b) 5.025 $\boxed{>}$ 5.0025

23. (a) 12 (b) 8

24. Find the average of following :

(a) $= \dfrac{1}{4} \times \left[\dfrac{1}{5} + \dfrac{2}{5} + \dfrac{3}{5} + \dfrac{4}{5} \right]$

$= \dfrac{1}{4} \times \left[\dfrac{1 + 2 + 3 + 4}{5} \right]$

$= \dfrac{1}{4} \times \dfrac{10}{5} = \dfrac{1}{2}$

(b) $= \dfrac{1}{4} \times \left[\dfrac{1}{4} + \dfrac{1}{3} + \dfrac{1}{6} + \dfrac{1}{2} \right]$

$= \dfrac{1}{4} \times \left[\dfrac{3 + 4 + 2 + 6}{12} \right]$

$= \dfrac{1}{4} \times \dfrac{15}{12} = \dfrac{5}{4 \times 4} = \dfrac{5}{16}$

(c) Average $=$

$\dfrac{2.1 + 2.2 + 2.3 + 2.4 + 2.5}{5}$

$= \dfrac{11.5}{5} = 2.3$

(d) Average $= \dfrac{3.1 + 2.8 + 3.4 + 2.5}{4}$

$= \dfrac{11.8}{4} = 2.95$

(e) Average $= \dfrac{150 + 144 + 126}{3}$

$= \dfrac{420}{3} = 140$

(f) Average $=$

$\dfrac{15 + 20 + 23 + 12 + 10}{5}$

$= \dfrac{80}{5} = 16$

25. Do yourself

26. Total quantity of oil in a tin

$= 91\dfrac{1}{2} \ l = \dfrac{183}{2} l = 91.5 \ l$

Capacity of a bottle $= 1\frac{1}{2} l = \frac{3}{2} l$

$= 1.5\ l$

∴ No of bottles that can be filled

$= \frac{91.5}{1.5} = 61$

27. Do yourself

28. Weight of half filled bottle

$= 241.5$ gm

∴ Weight of completely filled bottle $= 241.5 \times 2 = 483$ gm

29. Annual income of a person $= ₹\ 2,50,000$

∴ Monthly income of a person $=$

$\frac{2,50,000}{12} = ₹\ 20833.33$

30. The cost of 25 m clothes = 1062.50

The cost of 12 m clothes

$= \frac{1062.50 \times 12}{25} = ₹\ 510$

31. Total amount with Reema $= ₹\ 250$

Amount spent on purchasing 12 notebooks $= 12 \times 15.50 = ₹\ 186$

Amount spent on purchasing 2 pencils $= 2 \times 1.25 = ₹\ 2.5$

Total amount spent $= ₹\ (186 + 2.5)$

$= ₹\ 188.5$

∴ Amount left with Reema $= ₹\ (250 - 188.5) = ₹\ 61.5$

32. Departure time of train = 8:00 pm

Arrival time of train = 8:00 am

Time taken to reach the station = 8:00 pm − 8:00 am = 12 hours

Distance between the stations = 1692 km

∴ Speed of train $= \frac{1692}{12} = 141$ km/h

33. Required % $= \frac{9}{12} \times 100 = 75\%$

34. Marks scored by a student = 18

Marks by which he failed = 36

Required percentage to pass in an exam = 36%

∴ Maximum marks $= \frac{18+36}{36} \times 100$

$= \frac{54}{36} \times 100 = 150$

35. Required % $= \frac{12}{1 \times 60} = 100$

$= \frac{12}{60} \times 100 \Rightarrow \frac{1}{5} \times 100$

$= 20\ \%$

36. C.P of an article $= ₹\ 650$

Profit percentage $= 20\ \%$

∴ S.P of an article $= \left(\frac{100 + 20}{100}\right) \times 650$

$= \frac{120}{100} \times 650 \Rightarrow ₹\ 780$

37. - 39. Do yourself

40. (a) Yes (b) No (c) Yes (d) No

41. (a) No (b) No (c) Yes (d) Yes

42. - 43. Do yourself

44. Perimeter of square = 252 m.

Perimeter of square = 4 × side

$252 = 4 \times$ side

∴ Side $= \frac{252}{4} = 63$ m

Now, area of square = Side × Side

$= 63 \times 63$

$= 3969$ m^2

Knowing Numbers
Exercise - 2.1

1. **Write :**

(a) 1, 7, 9 (b) 0 (c) Not possible

2. **Write in numerals :**

(a) 728950920

(b) 6746214307

(c) 2703381201

3. **Write in words (in Indian system) :**

(a) 43, 176 = Forty three thousand one hundred seventy six

(b) 62, 39, 148 = Sixty two lakh thirty nine thousand one hundred forty eight.

(c) 8,73,204 = Eight lakh seventy three thousand two hundred four

4. **Write in words (International system :)**
   (a) 7,921,503 = Seven million nine hundred twenty one thousand five hundred three
   (b) 298,634,175 = Two hundred ninety eight million six hundred thirty four thousand one hundred seventy five
   (c) 12,000,400 = Twelve million four hundred

5. Difference between face value and place value =

$$\begin{array}{r} 6\,0\,0\,0\,0 \\ -6 \\ \hline 5\,9\,9\,9\,4 \end{array}$$

6. 90000

7. Yes, All natural numbers are whole numbers.

8. No, all whole numbers are not natural numbers.

9. Difference =

$$\begin{array}{r} 4\,0\,0\,0\,0\,0\,0\,0 \\ -4\,0\,0\,0 \\ \hline 3\,9\,9\,9\,6\,0\,0\,0 \end{array}$$

10. Difference = 7 − 7
    Face value = 0

11. **Write each in expanded form :**
    (a) 641532 → 600000 + 40000 + 1000 + 500 + 30 + 2
    (b) 74259 → 70000 + 4000 + 200 + 50 + 9
    (c) 80760 → 80000 + 700 + 60

12. **Write in short form :**
    (a) 627318 (b) 35204 (c) 73190
    (d) 5791

13. 100

14. 10

15. 10

16. 1

17. 100

18. 10

19. 100

20. (a) smallest (b) first (c) hundred (d) numeral (e) natural

21. 10248 smallest

22. 9720 greatest

Exercise 2.2

1. **Write the predecessor of :**
   (a) 1479   →   1478
   (b) 10047   →   10046
   (c) 289   →   288
   (d) 87413   →   87412
   (e) 2000   →   1999
   (f) 376   →   375

2. **Write the successor of :**
   (a) 6192430   →   6192431
   (b) 72143   →   72144
   (c) 893   →   894
   (d) 10246754 →   10246755
   (e) 211   →   212
   (f) 5618   →   5619

3. Do yourself

4. **Fill in the blanks by > or < :**
   (a) 73   > 46   (b) 1001 > 462
   (c) 407   < 699

5. **Arrange in ascending order :**
   3219497 < 4126713 < 5829176 < 6104241 < 7624198

6. **Arrange in descending order :**
   980199 > 703142 > 614238 > 479104

7. 147, 146, 145 ; 2782, 2781, 2780

8. 174, 175, 176, 177 ; 3190, 3191, 3192, 3193

9. **Write :**
   (a) smallest 7 digit = 1000000
   (b) smallest 8 digit = 10000000

(c) smallest 6 digit = 100000
(d) greatest 5 digit = 99999

10. Greatest number = $\quad$ 9 8 7 4 1 0
   Smallest number = $\quad$ + 1 0 4 7 8 9
   Sum $\qquad$ = $\quad$ 10 9 2 1 9 9

11. Greatest number = $\quad$ 6 5 3 2 1
   Smallest number = $\quad$ − 1 2 3 5 6
   Difference $\qquad$ = $\quad$ 5 2 9 6 5

12. (a) 73, 37 (b) 90, 9 (c) 14, 41

13. 99999, 100000, greater = 100000

14. 9999, 10000, smaller = 9999

Exercise 2.3

1. **Estimate each sum to the nearest ten :**
   (a) 74 + 82 $\qquad$ (b) 34 + 49
   $\quad$ Nearest ten $\qquad$ Nearest ten
   $\quad$ 70 + 80 = 150 $\qquad$ 30 + 50 = 80
   (c) 63 + 78 $\qquad$ (d) 49 + 37
   $\quad$ Nearest ten $\qquad$ Nearest ten
   $\quad$ 60 + 80 = 140 $\qquad$ 50 + 40 = 90

2. **Estimate each sum to the nearest hundred :**
   (a) 435 + 762
   $\quad$ Nearest hundred
   $\quad$ 400 + 800
   $\quad$ = 1200
   (b) 168 + 674
   $\quad$ Nearest hundred
   $\quad$ 200 + 700
   $\quad$ = 900
   (c) 297 + 342
   $\quad$ Nearest hundred
   $\quad$ 300 + 300
   $\quad$ = 600
   (d) 537 + 813
   $\quad$ Nearest hundred
   $\quad$ 500 + 800
   $\quad$ = 1300

3. **Estimate each difference to the nearest ten :**
   (a) 64 − 21 $\qquad$ (b) 48 − 19
   $\quad$ Nearest ten $\qquad$ Nearest ten
   $\quad$ 60 − 20 $\qquad$ 50 − 20
   $\quad$ = 40 $\qquad$ = 30
   (c) 76 − 36 $\qquad$ (d) 93 − 71
   $\quad$ Nearest ten $\qquad$ Nearest ten
   $\quad$ 80 − 40 $\qquad$ 90 − 70
   $\quad$ = 40 $\qquad$ = 20

4. **Estimate each difference to the nearest thousand :**
   (a) 8725 − 4136
   $\quad$ Nearest thousand
   $\quad$ 9000 − 4000
   $\quad$ = 5000
   (b) 9354 − 1826
   $\quad$ Nearest thousand
   $\quad$ 9000 − 2000
   $\quad$ = 7000
   (c) 7610 − 3045
   $\quad$ Nearest thousand
   $\quad$ 8000 − 3000
   $\quad$ = 5000
   (d) 5319 − 2987
   $\quad$ Nearest thousand
   $\quad$ 5000 − 3000
   $\quad$ = 2000

Operations on Whole Numbers
Exercise - 3.1

1. **Fill in the box :**
   (a) 2063 + 372 = $\boxed{372}$ + 2063
   $\quad$ = $\boxed{2435}$
   (b) 345798 + 0 = 0 + $\boxed{345798}$
   $\quad$ = $\boxed{345798}$
   (c) (422 + 933) + 428 = 428 + $\boxed{933}$
   $\quad$ + 422 = $\boxed{1783}$
   (d) $\boxed{200}$ + 306 = $\boxed{306}$ + 200 = 506

2. Add many ways
$22 + 45 + 54 = 121$
$45 + 54 + 22 = 121$
$54 + 22 + 45 = 121$
$45 + 22 + 54 = 121$
$22 + 54 + 45 = 121$
$54 + 45 + 22 = 121$ Commutative

3. **Add and check the answers by reversing the order of the numbers**
(a) $4567 + 6812 = 11379$
(b) $323 + 475 = 798$
(c) $80006 + 60022 = 140028$
(d) $634 + 437 = 1071$
(e) $0 + 345678 = 345678$
(f) $101 + 403 = 504$

4. **Solve these sums and check them by associative law :**
(a) $(456 + 320) + 472$
$776 + 472$
$= 1248$
By associative law
$456 + (320 + 472)$
$= 456 + 792$
$= 1248$
(b) $322 + (409 + 1133)$
$322 + 1542$
$= 1864$
By associative law
$(322 + 409) + 1133$
$= 731 + 1133$
$= 1864$
(c) $(937 + 427) + 362$
$= 1364 + 362$
$= 1726$
By associate law
$937 + (427 + 362)$
$= 937 + 789$
$= 1726$
(d) $2579 + (6432 + 100666)$

$= 2579 + 107098$
$= 109677$
By associate law
$(2579 + 6432) + 100666$
$= 9011 + 100666$
$= 109677$
(e) $(4307 + 2060) + 2409$
$= 6367 + 2409$
$= 8776$
By associate law
$4307 + (2060 + 2409)$
$= 4307 + 4469$
$= 8776$
(f) $5068 + (2046 + 3456)$
$= 5068 + 5502$
$= 10570$
By associate law
$(5068 + 2046) + 3456$
$= 7114 + 3456$
$= 10570$

5. **Do suitable rearrangement then add them :**
(a) $633 + 922 + 834$
$= 834 + 922 + 663$
$= 2419$
(b) $504 + 362 + 476$
$= 476 + 362 + 504$
$= 1342$
(c) $2363 + 8622 + 1472$
$= 1472 + 8622 + 2363$
$= 12457$
(d) $3627 + 487 + 577$
$= 3627 + 577 + 487$
$= 4691$
(e) $323 + 36 + 4723$
$= 4723 + 323 + 36$
$= 5082$
(f) $8005 + 207 + 306$
$= 8005 + 306 + 207 = 8518$

Exercise - 3.2

1. (a) $5732 - 322 = 5410$
Verification by property 5
Result + Smaller number = Larger whole number
$5410 + 322 = 5732$

(b) $4632 - 442 = 4190$
Verification by property 5
Result + Smaller number = Larger number
$4190 + 442 = 4632$

(c) $10111213 - 9111314 = 999899$
Verification by property 5
Result + Smaller number = Larger number
$999899 + 9111314 = 10111213$

(d) $500000 - 87978 = 412022$
Verification by property 5
Result + Smaller number = Larger number
$412022 + 87978 = 500000$

(e) $672 - 584 = 88$
Verification by property 5
Result + Smaller number = Larger number
$88 + 584 = 672$

(f) $427 - 126 = 301$
Verification by property 5
Result + Smaller number = Larger number
$301 + 126 = 427$

2. Verify property 4 of subtraction by the following :
(a) $237594 - (86425 - 56892)$ and
$(235794 - 86425) - 56892$
$\Rightarrow 237594 - 29533$ and
$149369 - 56892$
$\Rightarrow 208061$ and 92477
So, $208061 \neq 92477$

$\therefore$ The associative law is not applicable
(b) $(267255 - 42623) - 33408$ and
$267255 - (42623 - 33408)$
$\Rightarrow 224632 - 33408$ and $267255 - 9215$
$\Rightarrow 191224$ and 258040
So, $191224 \neq 258040$

$\therefore$ The associative law is not applicable
(c) and (d) $\rightarrow$ Do same as above part

3. Fill each ☐ by correct digit :

(a)
```
  8 2 5
- 6 5 2
─────────
  1 7 3
```

(b)
```
  4 5 3 2
- 3 1 4 1
─────────
  1 3 9 1
```

(c)
```
  6 9 5 7 8 3 1
- 2 3 5 9 4 2 1
─────────────
  4 5 9 8 4 1 0
```

(d)
```
  1 0 0 0 0 0 0
-   4 5 9 8 7 9
─────────────
    5 4 0 1 2 1
```

(e)
```
  6 0 5 3 2
- 5 6 3 0 0
─────────
  0 4 2 3 2
```

(f)
```
  5 5 5 5 5 5
- 4 4 4 4 4 4
─────────────
  1 1 1 1 1 1
```

4. 6 digit largest number = 999999
7 digit smallest number = 1000000
```
  1 0 0 0 0 0 0
-   9 9 9 9 9 9
─────────────
```
Difference = 000001

5. Greatest number =
Smallest number = −
Difference =
```
  9 9 9 9 9
  1 0 0 0 0
─────────
  8 9 9 9 9
```

6. Amount deposited = ₹ 5 5 0 0 0
Amount withdrawn = −₹ 4 6 4 6 7
Amount left = ₹ 8 5 3 3

7. Total number of votes = 4 4 0 0 0
   No. of women votes = − 1 5 0 0 0
   No. of man votes =   2 9 0 0 0
8. Total patients in the hospital
   = 1200 male + 1000 female + 200
   child = 2400
   Vacant seats = Total capacity −
   Total patients
   = 4000 − 2400
   = 1600

Exercise - 3.3

1. **Fill in the box true statements:**
   (a) $422 \times 6 = \boxed{2532}$
   (b) $372 \times 0 = \boxed{0}$
   (c) $5665 \times 9 = 9 \times \boxed{5665}$
   (d) $181 \times (5 + 6) = \boxed{181} \times \boxed{5} + \boxed{181} \times \boxed{6}$
   (e) $278 \times (9 - 6) = \boxed{278} \times \boxed{9} - \boxed{278} \times \boxed{6}$
   (f) $327 \times (5 - 2) = 327 \boxed{\times} 5 \boxed{-} 327 \boxed{\times} 2$
   (g) $7902 \times 1 = \boxed{7902}$
   (h) $10 \times 100 \times \boxed{10000} = 10000000$
   (i) $45 \times 76 \times 87 = \boxed{76} \times 87 \times 45$
   (j) $55 \times 45 - 55 \times 34 = 55 \times \boxed{(45 - 34)}$
   (k) $70 \times 40 + 70 \times 60 = 70 \times \boxed{(40 + 60)}$

2. (a) Commutative property
   (b) Distributive property of multi-plication over addition
   (c) Closure
   (d) Existance of multiplicative identity (e) Closure
   (f) Distributive property of multi-plication over subtraction

3. (a) $532 \times 82 = 43624$
   (b) $422 \times 65 = 27430$
   (c) $1001 \times 77 = 77077$
   (d) $541 \times 1004 = 543164$
   (e) $266 \times 1097 = 291802$
   (f) $2032 \times 45 = 91440$

4. (a) $942 \times (100 - 5)$
   using distributive law
   $= 942 \times 100 - 942 \times 5$
   $= 94200 - 4710$
   $= 89490$
   (b) $472 \times (20 + 2)$
   using distributive law
   $= 472 \times 20 + 472 \times 2$
   $= 9444 + 944$
   $= 10384$
   (c) $266 \times (105)$
   using distributive law
   $= 266 \times (100 + 5)$
   $= 26600 + 266 \times 5$
   $= 26600 + 1330$
   $= 27930$
   (d) 5622×330
   using distributive law
   $= 5622 \times (300 + 30)$
   $= 5622 \times 300 + 5622 \times 30$
   $= 1686600 + 168660$
   $= 1855260$
   (e) $1066 \times (100 - 12)$
   using distributive law
   $= 1066 \times 100 - 1066 \times 12$
   $= 106600 - 12792$
   $= 93808$
   (f) 4687×240
   using distributive law
   $= 4687 \times (200 + 40)$
   $= 4687 \times 200 + 4687 \times 40$
   $= 937400 + 187480$
   $= 1124880$

5. (a) $5 \times 1950 \times 87$
   $= 87 \times 1950 \times 5$
   $= 87 \times 9750$
   $= 848250$
   (b) $4 \times 222 \times 25$
   $= (4 \times 25) \times 222$
   $= 100 \times 222$
   $= 22200$

(c) $325 \times 8 \times 72 \times 5$
$= 2600 \times 360$
$= 936000$

(d) $40 \times 30 \times 350 \times 9$
$= 1200 \times 3150$
$= 3780000$

(e) $125 \times 20 \times 5 \times 4$
$= 125 \times 100 \times 4$
$= 50000$

(f) $(230 \times 9) \times (40 \times 8)$
$= 2070 \times 320$
$= 662400$

6. (a) $522 \times 20 + 522 \times 5$
$= 522 (20 + 5)$
$= 522 \times 25$
$= 13050$

(b) $124 \times 15 + 124 \times 45$
$= 124 (15 + 45)$
$= 124 \times 60$
$= 7440$

(c) $576 \times 4 + 6 \times 576$
$= 576 (4 + 6)$
$= 576 \times 10$
$= 5760$

(d) $233 \times 25 + 233 \times 5 - 233 \times 20$
$= 233 (25 + 5 - 20)$
$= 233 \times (30 - 20)$
$= 233 \times 10 = 2330$

(e) $367 \times 9999 + 367$
$= 367 (9999 + 1)$
$= 367 \times 10000$
$= 3670000$

(f) $897 \times 99 \times 897 \times 99$
$= 897 \times (99 \times 99)$
$= 7885972809$

(g) $46 \times 686 + 40 \times 686 + 14 \times 686$
$= 686 (46 + 40 + 14)$
$= 686 \times (100)$
$= 68600$

(h) $32 \times 837 + 8 \times 837 - 20 \times 837 - 20 \times 837$
$= 837 (32 + 8 - 20 - 20)$
$= 837 (40 - 40)$
$= 837 \times 0 = 0$

(i) $15 \times 333 \times 6 - 15 \times 333 \times 4$
$= 333 (15 \times 6 - 15 \times 4)$
$= 333 \times (90 - 60)$
$= 333 \times 30$
$= 9990$

(j) $5255 \times 5255 - 5255 \times 255$
$= 5255 (5255 - 255)$
$= 5255 \times 5000$
$= 26275000$

7. Largest 4 digit number $= 9999$
Largest 6 digit number $= 999999$
$= 9999 \times 999999$
Using distributive law
$= 9999 \times (1000000 - 1)$
$= 9999000000 - 9999$
$= 9998990001$

8. True

9. True

10. False

11. False

12. One T.V cost $= ₹ 4900$
49 T.V cost $= 4900 \times 49$
Total cost of 49 T.V $= ₹ 240100$

13. One car cost $= ₹ 235000$
89 car cost $= 235000 \times 89$
$= ₹ 20915000$

14. The cost of 27 cycles $= ₹ 40500$
The cost of 38 motorcycles
$= ₹ 1102000$
Total cost $= ₹ 1142500$

15. (i) Both number are zero.
(ii) Any one of them is zero.

16. Total students $= 40 \times 4 = 160$
Total collection of fee from class

VI $= 4 \times 40 \times 75$
$= 160 \times 75$
$= ₹ 12000$

17. Verification if $x = 19$ and $y = 1$

L.H.S $= (x+y)(x-y)$
$\quad = (19+1)(19-1)$
$\quad = 20 \times 18 = 360$

R.H.S $= x \times x - y \times y$
$\quad = 19 \times 19 - 1 \times 1$
$\quad = 361 - 1 = 360$

So, L.H.S = R.H.S

18. If n = 5, then

L.H.S $= 1 + 2 + 3 + 4 + 5 = 15$

R.H.S $= \dfrac{5(5+1)}{2} = \dfrac{5 \times 6}{2} = 15$

So, L.H.S = R.H.S
If n = 8, then
L.H.S $= 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 = 36$

R.H.S $= \dfrac{8(8+1)}{2} = \dfrac{8 \times 9}{2} = 36$

So, L.H.S = R.H.S
If n = 10, then
L.H.S $= 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = 55$

R.H.S $= \dfrac{10(10+1)}{2} = \dfrac{10 \times 11}{2} = 55$

So, L.H.S = R.H.S

19. L.H.S $= x \times x \times x - 1$
if $x = 200$ then
$= 200 \times 200 \times 200 - 1$
$= 8000000 - 1 = 7999999$ and
R.H.S $= (x-1) \times (x \times x + x + 1)$
$\quad = (200-1) \times (200 \times 200 + 200 + 1)$
$\quad = 199 \times (40000 + 200 + 1)$
$\quad = 199 \times 40201$
$\quad = 7999999$

So, L.H.S = R.H.S

20. Speed $= 45$ km/h
Total time $= 87$ hours
Distance $=$ Speed $\times$ Time
$\qquad = 45 \times 87 = 3915$ km

Exercise - 3.4

1. (a)
$$17\,)\,\overline{1520}\,(\,89$$
$$\underline{136}\downarrow$$
$$160$$
$$\underline{153}$$
$$7$$
Quotient = 89
Remainder = 7

(b)
$$21\,)\,\overline{3304}\,(\,157$$
$$\underline{21}\downarrow$$
$$120$$
$$\underline{105}\downarrow$$
$$154$$
$$\underline{147}$$
$$7$$
Quotient = 157
Remainder = 7

(c)
$$8\,)\,\overline{472}\,(\,59$$
$$\underline{40}\downarrow$$
$$72$$
$$\underline{72}$$
$$0$$
Quotient = 59
Remainder = 0

(d)
$$8\,)\,\overline{23678}\,(\,2959$$
$$\underline{16}\downarrow$$
$$76$$
$$\underline{72}\downarrow$$
$$47$$
$$\underline{40}\downarrow$$
$$78$$
$$\underline{72}$$
$$6$$
Quotient = 2959
Remainder = 6

(e)
$$369\,)\,\overline{5679832}\,(\,15392$$
$$\underline{369}\downarrow$$
$$1989$$
$$\underline{1845}\downarrow$$
$$1448$$
$$\underline{1107}\downarrow$$
$$3413$$
$$\underline{3321}\downarrow$$
$$922$$
$$\underline{738}$$
$$184$$
Quotient = 15392
Remainder = 184

(f) 556) 935875 (1683
```
      556↓
      3798
      3336↓
      4627
      4448↓
      1795
      1668   Quotient = 1683
       127   Remainder = 127
```

(g) 625) 12252525 (19604
```
      625 ↓
      6002
      625 ↓
      3775
      3750↓
      2525
      2500   Quotient = 19604
        25    Remainder = 25
```

(h) 975) 12545 (12
```
      975↓
      2795
      1950   Quotient = 12
       845   Remainder = 845
```

(i) 125) 8756 (70
```
      875↓
        6    Quotient = 70
             Remainder = 6
```

2. (a) 13) 3459 (266
```
      26↓
      85
      78↓
      79
      78
       1
```
Checking :-
Dividend = Divisor × Quotient + Remainder
= 13 × 266 + 1 = 3459

(b) 187) 5678987 (30368
```
      561↓↓↓
      689
      561↓
      1288
      1122↓
      1667
      1496
       171
```
Quotient = 30368
Remainder = 171
Checking : -
Dividend = Divisor × Quotient + Remainder
= 187 × 30368 + 171 = 5678987

(c) 925) 485625 (525
```
      4625↓
      2312
      1850↓
      4625
      4625   Quotient = 525
         0   Remainder = 0
```
Checking :-
Dividend = Divisor × Quotient + Remainder
= 925 × 525 + 0 = 485625

(d) 1000) 33475876 (33475
```
      3000↓↓↓
      3475
      3000↓
      4758
      4000↓
      7587
      7000↓
      5876
      5000
       876
```
Quotient = 33475
Remainder = 876

Checking :-
Dividend = Divisor × Quotient + Remainder
= 1000 × 33475 + 876 = 33475876

(e)
$$436 \overline{)857588} (1966$$
```
      436↓
      4215
      3924↓
      2918
      2616↓
      3028
      2616
       412
```
Quotient = 1966
Remainder = 412

Checking :-
Dividend = Divisor × Quotient + Remainder
= 436 × 1966 + 412 = 857588

(f)
$$352 \overline{)4178} (11$$
```
     352↓
     658
     352
     306
```
Quotient = 11
Remainder = 306

Checking :-
Dividend = Divisor × Quotient + Remainder
= 352 × 11 + 306 = 4178

(g)
$$25 \overline{)260975} (10439$$
```
    25↓↓↓
    109
    100↓
     97
     75↓
     225
     225
       0
```
Quotient = 10439
Remainder = 0

Checking :-
Dividend = 25 × 10439 + 0
= 260975

(h)
$$3205 \overline{)25975817} (8104$$
```
       25640↓
        3358
        3205↓
       15317
       12820
        2497
```
Quotient = 8104
Remainder = 2497

Checking :-
Dividend = 3205 × 8104 + 2497
= 25975817

(i)
$$225 \overline{)67850} (301$$
```
     675↓
     350
     225
     125
```
Quotient = 301
Remainder = 125

Checking :-
Dividend = 225 × 301 + 125
= 67850

3. $\dfrac{n}{n} = 1$

4. Dividend = Divisor × Quotient + Remainder
8956798 = Divisor × 20264 + 110
$\Rightarrow$ Divisor = $\dfrac{8956798 - 110}{20264}$
$= \dfrac{8956688}{20264} = 442$

5. 7-digit smallest number = 1000000
$$79 \overline{)1000000} (12658$$
```
    79
    210
    158
    520
    474
    460
    395
    650
    632
     18
```

14

So, required number = 1000000 + (79 − 18) = 1000061

6. 55 coats cost = ₹ 308055

$$1 \text{ coat cost} = \frac{308055}{55} = ₹ 5601$$

7. Greatest 4-digit no. = 9999

$$26\overline{)9999}(384$$
$$\underline{78\downarrow}$$
$$219$$
$$208\downarrow$$
$$\overline{119}$$
$$\underline{104}$$
$$\overline{15}$$

Required no. = 9999 − 15 = 9984

8. Given number = 98928321
Quotient = 304394
Remainder = 271
Dividend = 98928321
Divisor = ?
Dividend = Divisor × Quotient + Remainder

$$Divisor = \frac{Dividend - Remainder}{Quotient}$$

$$= \frac{98928321 - 271}{304394} = 325$$

9. Quotient = 21921
Divisor = 35
Remainder = 24
Dividend = Quotient × Divisor + Remainder
= 21921 × 35 + 24 = 767259

10. Greatest number of 6-digit = 999999

$$433\overline{)999999}(2309$$
$$\underline{866}$$
$$\overline{1339}$$
$$\underline{1299}$$
$$\overline{4099}$$
$$\underline{3897}$$
$$\overline{202}$$

Checking :-
Dividend = Quotient × Divisor + Remainder
= 433 × 2309 + 202 = 999999

11. Cost of 1 kg apple costs = ₹35

$$35\overline{)1225}(35$$
$$\underline{105}$$
$$\overline{175}$$
$$\underline{175}$$
$$\overline{0}$$

So, In ₹1225 bought apples = 35 kg

12. The number of chairs in 55 rows = 3025

$$55\overline{)3025}(55$$
$$\underline{275}$$
$$\overline{275}$$
$$\underline{275}$$
$$\overline{0}$$

So, each row contains 55 chairs.

13.
$$29\overline{)1522}(52$$
$$\underline{145}$$
$$\overline{72}$$
$$\underline{58}$$
$$\overline{14}$$

Required no. = 29 − 14 = 15

14.
$$43\overline{)6722}(156$$
$$\underline{43}$$
$$\overline{242}$$
$$\underline{215}$$
$$\overline{272}$$
$$\underline{258}$$
$$\overline{14}$$

So, 14 must be subtracted from 6722.

15. (a) $972 \div 1$
= 972
(b) $0 \div 443$
= 0
(c) $19732 + (459565 \div 5)$
= 19732 + 91913
= 111645
(d) $(2122 \div 2122) - (2121 \div 2121)$
= 1 − 1
= 0

(e) $495 - (625 \div 25)$
  $= 495 - 25$
  $= 470$
(f) $(15625 \div 125) \div 125$
  $= 125 \div 125$
  $= 1$
(g) $(15000 \div 150) + 200 \times (15000 \div 15)$
  $= 100 + 200 \times 1000$
  $= 100 + 200000$
  $= 200100$
(h) $\{(441 \times 441) \div 21\} \div (441 \times 21)$
  $= \{441 \times 441 \div 21\} \div 441 \times 21$
  $= 441 \times 21 \div 441 \times 21 = 1$

16. 7-digit greatest = 9999999

$$72\overline{)9999999}(138888$$
$$\underline{72}$$
$$279$$
$$\underline{216}$$
$$639$$
$$\underline{576}$$
$$639$$
$$\underline{576}$$
$$639$$
$$\underline{576}$$
$$639$$
$$\underline{576}$$
$$63$$

Required number $= 9999999 - 63$
$= 9999936$

17. $25\overline{)6252500}(250100$
$$\underline{50}$$
$$125$$
$$\underline{125}$$
$$25$$
$$\underline{25}$$
$$0$$
$$\underline{0}$$
$$0$$
$$\underline{0}$$
$$0$$

Required no.
250100

18. $x \div y = y \div x$ false

19. Verification :-
(i) if $x = 2$
L.H.S $= (x \times x \times x - 1) \div (x - 1)$
  $= (2 \times 2 \times 2 - 1) \div (2 - 1) = 7$
R.H.S $= x \times x + x + 1$
  $= 2 \times 2 + 2 + 1 = 7$
L.H.S = R.H.S
(ii) if $x = 5$
L.H.S $= (5 \times 5 \times 5 - 1) \div (5 - 1)$
  $= 124 \div 4 = 31$
R.H.S $= 5 \times 5 + 5 + 1 = 25 + 6 = 31$
L.H.S = R.H.S
(iii) if $x = 7$
L.H.S $= (7 \times 7 \times 7 - 1) \div (7 - 1)$
  $= 342 \div 6 = 57$
R.H.S $= 7 \times 7 + 7 + 1$
  $= 49 + 8 = 57$
L.H.S = R.H.S
So for $x = 2, 5, 7$ it is true.

20. L.H.S $= x \div (y \div z)$
  $= 3 \div (5 \div 9)$
  $= 3 \div \dfrac{5}{9} = \dfrac{27}{5}$
R.H.S $= (x \div y) \div z$
  $= (3 \div 5) \div 9$
  $= \dfrac{3}{5} \times \dfrac{1}{9} = \dfrac{1}{15}$
L.H.S $\neq$ R.H.S
So, it is false.

Playing with Numbers
Exercise - 4.1

1. $16 + 8 \div 4 - 2 \times 3$
  $= 16 + 2 - 2 \times 3$
  $= 16 + 2 - 6$
  $= 18 - 6$
  $= 12$

2. $100 \div 5 + 20 \div 4$
  $= 20 + 20 \div 4$
  $= 20 + 5$
  $= 25$

3. $21 - 12 \div 3 \times 2$
  $= 21 - 4 \times 2$
  $= 21 - 8$
  $= 13$

4. $38 \div (10 + 9)$
$= 38 \div 19 = 2$

5. $13 - (12 - 6 \div 3)$
$= 13 - (12 - 2)$
$= 13 - 10$
$= 3$

6. $8 + 4 \div 2 \times 5$
$= 8 + 2 \times 5$
$= 8 + 10$
$= 18$

7. $15 + 6 - 3 \div (15 \div 5)$
$= 15 + 6 - 3 \div 3$
$= 15 + 6 - 1$
$= 21 - 1$
$= 20$

8. $133 + 28 \div 7 - 8 \times 2$
$= 133 + 4 - 8 \times 2$
$= 133 + 4 - 16$
$= 137 - 16 = 121$

9. $19 - [4 + \{16 - (12 - 2)\}]$
$= 19 - [4 + \{16 - 10\}]$
$= 19 - [4 + \{6\}]$
$= 19 - [4 + 6]$
$= 19 - 10 = 9$

10. $15 - [3 + \{16 - (20 - 5)\}]$
$= 15 - [3 + \{16 - 15\}]$
$= 15 - [3 + 1]$
$= 15 - 4 = 11$

11. $72 + 35 \div 5 \times (6 + 7 - 18 \div 2)$
$= 72 + 35 \div 5 \times (6 + 7 - 9)$
$= 72 + 35 \div 5 \times (13 - 9)$
$= 72 + 7 \times 4$
$= 72 + 28 = 100$

12. $36 - [18 - \{14 - (15 - 4 \div 2 \times 2)\}]$
$= 36 - [18 - \{14 - (15 - 2 \times 2)\}]$
$= 36 - [18 - \{14 - (15 - 4)\}]$
$= 36 - [18 - \{14 - 11\}]$
$= 36 - [18 - 3]$
$= 36 - 15 = 21$

Exercise - 4.2

1. Do yourself

2. **Write down all the factors of :**
(a) $20 = 1, 2, 4, 5, 10, 20$
(b) $30 = 1, 2, 3, 5, 6, 10, 15, 30$
(c) $40 = 1, 2, 4, 5, 8, 10, 20, 40$
(d) $70 = 1, 2, 5, 7, 10, 14, 35, 70$

3. Do yourself **4.** Do yourself

5. **Write first five multiples of :**
(a) $12 = 12, 24, 36, 48, 60$ multiples
(b) $13 = 13, 26, 39, 52, 65$ multiples
(c) $17 = 17, 34, 51, 68, 85$ multiples
(d) $18 = 18, 36, 54, 72, 90$ multiples
(e) $19 = 19, 38, 57, 76, 95$ multiples

6. **Choose out even and odd numbers**
Even numbers (b) 38 (d) 48
Odd numbers (a) 39 (c) 65

7. **Write all prime numbers between:**
(a) 41, 43, 47, 53, 59, 61, 67, 71, 73, 79 (b) 31, 37 (c) 83, 89, 97

8. (a) Smallest prime number = 2
(b) Even prime number = 2
(c) Smallest odd prime number = 3

9. 5 odd number = 1, 3, 5, 7, 9

10. **Find which of the following numbers are prime :**
(a) 97 (c) 89

11. Yes, composite number can be odd smallest odd composite no. = 9

12. **Co-primes :-** If the two numbers have no common factor other than 1, are called co-prime. Ex:- (2, 3), (3, 4)

13. **Twin prime : -** Two consecutive odd prime numbers are called twin prime numbers.
(i) 3, 5 (ii) 5, 7 (iii) 11, 13 (iv) 17, 19 (v) 29, 31 (vi) 41, 43 (vii) 59, 61 (viii) 71, 73

14. **Express each as sum of two odd primes:**
(a) $17 + 19 = 36$ (b) $5 + 37 = 42$
(c) $19 + 89 = 108$ (c) $13 + 73 = 96$

15. Yes

16. **Express each of the following as the sum of twin-primes :**
(a) $11 + 13 = 24$ (b) $17 + 19 = 36$
(c) $59 + 61 = 120$ (d) $41 + 43 = 84$
(e) $71 + 73 = 144$

Exercise - 4.3

1. (a) 2570
$\therefore$ Unit place is zero
So it is divisible by 2.

(b) 23075
It is not divisible by 2 because unit place digit is an odd number.
(c) 594321
Unit place digit = 1 (odd number)
So, it is not divisible by 2.

2. (a) 45678
The sum of all digits = 4 + 5 + 6 + 7 + 8 = 30
∴ 30 is divisible by 3
So, the number is divisible by 3.
(b) 56742
The sum of all digits = 5 + 6 + 7 + 4 + 2 = 24
∴ 24 is divisible by 3
So the number is also divisible by 3
(c) Do same as above

3. (a) 26910
It is divisible by 2 but not divisible by 3
So it is not divisible by 6
(b) and (c) → Do same as above part

4. 6252
Last two digits = 52
So, $\dfrac{52}{4}$ = 13 (divisible by 4)
So, the number itself is also divisible by 4
(b) and (c) → Do same as above part

5. (a) 756840
Last three digit = 840
∴ $\dfrac{840}{8}$ = 105 (divisible by 8)
So, the number itself is also divisible by 8
(b) and (c) → Do same as above part

6. (a) 5687
Sum of digits in even places
= 6 + 7 = 13
and sum of digits in odd places
= 5 + 8 = 13
Difference of these sum
= 13 − 13 = 0
So, the number 5687 is divisible by 11.
(b) and (c) → Do same as above part

7. 3265
∴ Unit place is 5 so the number 3265 is divisible by 5
(b) and (c) - Do same as above part

8. (a) 4 5 9 ⑦ 3 4   (Divisible by 11)
(b) 5 8 7 6 ⑧ 8   (Divisible by 11)
(c) 2 5 8 ④ 5 6   (Divisible by 11)

9. (a) 3 7 ⓪ 8 8 (b) 6 5 ⓪ 4 (c) 5 2 ① 4 4

10. **Give an example of a number :**
(a) Divisible by 2 but not by 4 = 498
(b) Divide by 2 and 6 but not by 12 = 150
(c) 1177 (d) 996

Exercise - 4.4

Find the prime factorization of each of the following numbers.

1.

2	16
2	8
2	4

→

2	2
	1

16 = 2 × 2 × 2 × 2

2.

2	22
11	11
	1

22 = 2 × 11

3.

2	44
2	22
11	11
	1

44 = 2 × 2 × 11

4.

2	56
2	28
2	14
7	7
	1

56 = 2 × 2 × 2 × 7

5.

7	49
7	7
	1

49 = 7 × 7

6.

2	954
3	477
3	159
53	53
	1

954 = 2 × 3 × 3 × 53

7.

5	325
5	65
13	13
	1

325 = 5 × 5 × 13

8.

2	520
2	260
2	130
13	65
5	5
	1

520 = 2 × 2 × 2 × 13 × 5

9.

3	999
3	333
3	111
37	37
	1

999 = 3 × 3 × 3 × 37

10.

$$
\begin{array}{c|c}
3 & 441 \\
\hline
3 & 147 \\
\hline
7 & 49 \\
\hline
7 & 7 \\
\hline
 & 1
\end{array}
$$

$441 = 3 \times 3 \times 7 \times 7$

Exercise - 4.5

1. Find the H.C.F of following numbers using prime factorization method :

(a) 49, 63

$49 = \boxed{7} \times 7$

$69 = \boxed{7} \times 3 \times 3$

H.C.F = 7

(b) 122, 242

$$
\begin{array}{c|c}
2 & 122 \\
\hline
61 & 61 \\
\hline
 & 1
\end{array}
\qquad
\begin{array}{c|c}
2 & 242 \\
\hline
11 & 121 \\
\hline
11 & 11 \\
\hline
 & 1
\end{array}
$$

$122 = \boxed{2} \times 61$

$242 = \boxed{2} \times 11 \times 11$

H.C.F = 2

(c) $80 = \boxed{2} \times 2 \times 2 \times 2 \times 5$

$246 = \boxed{2} \times 3 \times 41$

H.C.F = 2

$$
\begin{array}{c|c}
2 & 246 \\
\hline
3 & 123 \\
\hline
41 & 41 \\
\hline
 & 1
\end{array}
$$

(d) 16, 64

$16 = \boxed{2} \times \boxed{2} \times \boxed{2} \times \boxed{2}$

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

H.C.F = $2 \times 2 \times 2 \times 2 = 16$

(e) to (h) → Do same as above parts

2. (a)

$$
\begin{array}{r}
82\overline{)92}(1 \\
82 \\
\hline
10\overline{)82}(8 \\
80 \\
\hline
2\overline{)10}(5 \\
10 \\
\hline
0
\end{array}
$$

Last divisor is 2
So H.C.F = 2

(b) 111, 225

$$
\begin{array}{r}
111\overline{)225}(2 \\
222 \\
\hline
\end{array}
$$

$$
\begin{array}{r}
3\overline{)111}(37 \\
9 \\
\hline
21 \\
21 \\
\hline
0
\end{array}
$$

Last divisor is 3
So, H.C.F = 3

(c) 23, 92

$$
\begin{array}{r}
23\overline{)92}(4 \\
92 \\
\hline
0
\end{array}
$$

H.C.F = 23

(d) 526, 879, 1055

$$
\begin{array}{r}
526\overline{)879}(1 \\
526 \\
\hline
353\overline{)526}(1 \\
353 \\
\hline
173\overline{)353}(2 \\
346 \\
\hline
7\overline{)173}(24 \\
14 \\
\hline
33 \\
28 \\
\hline
5\overline{)7}(1 \\
5 \\
\hline
2\overline{)5}(2 \\
4 \\
\hline
1\overline{)2}(2 \\
2 \\
\hline
0
\end{array}
$$

H.C.F = 1

(e) 272, 384

$$
\begin{array}{r}
272\overline{)384}(1 \\
272 \\
\hline
112\overline{)272}(2 \\
224 \\
\hline
48\overline{)112}(2 \\
96 \\
\hline
16\overline{)48}(3 \\
48 \\
\hline
0
\end{array}
$$

H.C.F = 16

(f) 405, 705

$$405\overline{)705}(1$$
$$\underline{405}$$
$$300\overline{)405}(1$$
$$\underline{300}$$
$$105\overline{)300}(2$$
$$\underline{210}$$
$$90\overline{)105}(1$$
$$\underline{90}$$
$$15\overline{)90}(6$$
$$\underline{90}$$
$$\underline{0}$$

H.C.F = 15

(g) 313, 1626

$$313\overline{)1626}(5$$
$$\underline{1565}$$
$$61\overline{)313}(3$$
$$\underline{305}$$
$$8\overline{)61}(7$$
$$\underline{56}$$
$$5\overline{)8}(1$$
$$\underline{5}$$
$$3\overline{)5}(1$$
$$\underline{3}$$
$$2\overline{)3}(1$$
$$\underline{2}$$
$$\underline{1}$$

H.C.F = 1

(h) 181, 522, 723

$$181\overline{)522}(2$$
$$\underline{362}$$
$$160\overline{)181}(1$$
$$\underline{160}$$
$$21\overline{)160}(7$$
$$\underline{147}$$
$$13\overline{)21}(1$$
$$\underline{13}$$
$$8\overline{)13}(1$$
$$\underline{8}$$
$$5\overline{)8}(1$$
$$\underline{5}$$
$$3\overline{)5}(1$$
$$\underline{3}$$
$$2\overline{)3}(1$$
$$\underline{2}$$
$$\underline{1}$$
$$1\overline{)2}(2$$
$$\underline{2}$$
$$\underline{\times}$$

H.C.F = 1

3. **Show that following pairs are co-prime :**
(b) 59, 97 (c) 2, 3 (d) 71, 97

4. $1354 - 10 = 1344$
$1866 - 10 = 1856$
$2762 - 10 = 2752$

$$1344\overline{)1856}(1$$
$$\underline{1344}$$
$$512\overline{)1344}(2$$
$$\underline{1024}$$
$$320\overline{)512}(1$$
$$\underline{320}$$
$$192\overline{)320}(1$$
$$\underline{192}$$
$$128\overline{)192}(1$$
$$\underline{128}$$
$$64\overline{)128}(2$$
$$\underline{128}$$
$$\underline{0}$$

$$64\overline{)2752}(43$$
$$\underline{256}$$
$$192$$
$$\underline{192}$$
$$\underline{0}$$

H.C.F = 64

So, the required number is 64.

5. $$2002\overline{)2618}(1$$
$$\underline{2002}$$
$$616\overline{)2002}(3$$
$$\underline{1848}$$
$$154\overline{)616}(4$$
$$\underline{616}$$
$$0$$

$2011 - 9 = 2002$
$2623 - 9 = 2618$

H.C.F = 154

So, the required greatest numbers is 154.

6. H.C.F of three consecutive no. = 1

7. $$1651\overline{)2032}(1$$
$$\underline{1651}$$
$$381\overline{)1651}(4$$
$$\underline{1524}$$
$$127\overline{)381}(3$$
$$\underline{381}$$
$$0$$

$1657 - 6 = 1651$
$2037 - 5 = 2032$

H.C.F = 127

So, the required greatest no. is 127.

8. 513, 783, 1107

$$513 \overline{)783} (1$$
$$\underline{513}$$
$$270 \overline{)513} (1$$
$$\underline{270}$$
$$243 \overline{)270} (1$$
$$\underline{243}$$
$$27 \overline{)243} (9$$
$$\underline{243}$$
$$0$$

$$27 \overline{)1107} (41 \leftarrow$$
$$\underline{108}$$
$$27$$
$$\underline{27}$$
$$0$$

H.C.F = 27

The required largest number is 27

9. (a) 1 (b) 2 (c) 1 (d) 1 (e) 2

10. The greatest possible same length is H.C.F of three pieces of clothes.

54, 69, 78

$$54 \overline{)69} (1$$
$$\underline{54}$$
$$15 \overline{)54} (3$$
$$\underline{45}$$
$$9 \overline{)15} (1$$
$$\underline{9}$$
$$6 \overline{)9} (1$$
$$\underline{6}$$
$$3 \overline{)6} (2$$
$$\underline{6}$$
$$0$$

$$3 \overline{)78} (26 \leftarrow$$
$$\underline{6}$$
$$18$$
$$\underline{18}$$
$$0$$

So, the required length is 3m.

11. 75, 90, 120

$$75 \overline{)90} (1$$
$$\underline{75}$$
$$15 \overline{)75} (5$$
$$\underline{75}$$
$$0$$

$$15 \overline{)120} (8$$
$$\underline{120}$$
$$0$$

Last divisor = 15

H.C.F = 15

The minimum number of shelves are 15.

12. Do yourself

13. (a) $\dfrac{117}{130} = \dfrac{9}{10}$ (b) $\dfrac{161}{207} = \dfrac{7}{9}$

(c) $\dfrac{296}{407} = \dfrac{8}{11}$ (d) $\dfrac{376}{423} = \dfrac{8}{9}$

14. 725, 870, 1015

$$725 \overline{)870} (1$$
$$\underline{725}$$
$$145 \overline{)725} (5$$
$$\underline{725}$$
$$0$$

$$145 \overline{)1015} (7$$
$$\underline{1015}$$
$$0$$

H.C.F = 145

So, the required maximum capacity = 145 liters.

Exercise - 4.6

1. (a) We have,

2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

3	225
3	75
5	25
5	5

2	226
113	113
	1

$\therefore$ 128 = 2 × 2 × 2 × 2 × 2 × 2 × 2

225 = 3 × 3 × 5 × 5

226 = 2 × 113

So, L.C.M = 2 × 2 × 2 × 2 × 2 × 2 × 2 × 3 × 3 × 5 × 5 × 113

= 3254400

(b) We have,

2	30
3	15
5	5
	1

2	32
2	16
2	8
2	4
2	2
	1

5	35
7	7
	1

2	40
2	20
2	10
5	5
	1

$\therefore$ 30 = 2 × 3 × 5

32 = 2 × 2 × 2 × 2 × 2

35 = 5 × 7

40 = 2 × 2 × 2 × 5

So, L.C.M = 2 × 2 × 2 × 2 × 2 × 5 ×

$7 \times 3 = 3360$

(c)

2	16
2	8
2	4
2	2
	1

2	28
2	14
7	7
	1

2	40
2	20
2	10
5	5
	1

∴ $16 = \boxed{2} \times \boxed{2} \times \boxed{2} \times 2$
$28 = \boxed{2} \times \boxed{2} \qquad \times \boxed{7}$
$40 = \boxed{2} \times \boxed{2} \times \boxed{2} \quad \times 5$
$56 = \boxed{2} \times \boxed{2} \times \boxed{2} \quad \times \boxed{7}$

2	56
2	28
2	14
7	7
	1

So, L.C.M $= 2 \times 2 \times 2 \times 2 \times 7 \times 5 = 560$

(d) We have,

2	144
2	72
2	36
2	18
3	9
3	3
	1

2	180
2	90
3	45
3	15
5	5
	1

2	190
5	95
19	19
	1

2	210
3	105
5	35
7	7
	1

∴ $144 = \boxed{2} \times \boxed{2} \times 2 \times 2 \times \boxed{3} \times \boxed{3}$
$180 = \boxed{2} \times \boxed{2} \qquad\qquad \times \boxed{3} \times \boxed{3} \times \boxed{5}$
$190 = \boxed{2} \qquad\qquad\qquad\qquad \times \boxed{5} \times 19$
$210 = \boxed{2} \qquad\qquad \times \boxed{3} \quad \times \boxed{5} \times 7$

So, L.C.M $= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 19 \times 7 = 95760$

(e) We have,

5	625
5	125
5	25
5	5
	1

5	1225
5	245
7	49
7	7
	1

∴ $625 = \boxed{5} \times \boxed{5} \times 5 \times 5$
$1225 = \boxed{5} \times \boxed{5} \qquad \times 7 \times 7$

So, L.C.M $= 5 \times 5 \times 5 \times 5 \times 7 \times 7 = 30625$

2. (a)

2	244, 460, 358, 220
2	122, 230, 179, 110
5	61, 115, 179, 55
61	61, 23, 179, 11
23	1, 23, 179, 11
11	1, 1, 179, 11
179	1, 1, 179, 1
	1, 1, 1, 1

L.C.M $= 2 \times 2 \times 5 \times 61 \times 23 \times 11 \times$
$179 = 55250140$

(b)

2	16, 18, 20, 22
2	8, 9, 10 11
2	4, 9, 5, 11
2	2, 9, 5, 11
3	1, 9, 5, 11
3	1, 3, 5, 11
5	1, 1, 5, 11
11	1, 1, 1, 11
	1, 1, 1, 1

L.C.M $= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times$
$11 = 7920$

(c)

2	336, 522, 366
2	168, 261, 183
2	84, 261, 183
2	42, 261, 183
3	21, 261, 183
3	7, 87, 61
7	7, 29, 61
29	1, 29, 61
61	1, 1, 61
	1, 1, 1

L.C.M $= 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 7 \times$
$29 \times 61 = 1783152$

(d)

2	84, 94, 78, 66
2	42, 47, 39, 33
3	21, 47, 39, 33
7	7, 47, 13, 11
11	1, 47, 13, 11
47	1, 47, 13, 1
13	1, 1, 13, 1
	1, 1, 1, 1

L.C.M = 2 × 2 × 3 × 7 × 11 × 47 × 13 = 564564

(e)

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

L.C.M = 2 × 2 × 2 × 3 × 5 × 7 = 840

(f)

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

L.C.M = 2 × 2 × 2 × 3 × 3 × 5 = 360

3.

2	12, 22, 32, 42
2	6, 11, 16, 21
2	3, 11, 8, 21
2	3, 11, 4, 21
2	3, 11, 2, 21
3	3, 11, 1, 21
11	1, 11, 1, 7
7	1, 1, 1, 7
	1, 1, 1, 1

L.C.M = 2 × 2 × 2 × 2 × 2 × 3 × 11 × 7 = 7392

So, the required smallest number = 7392

4.

2	6, 7, 8, 9, 10, 12
2	3, 7, 4, 9, 5, 6
2	3, 7, 2, 9, 5, 3
3	3, 7, 1, 9, 5, 3
3	1, 7, 1, 3, 5, 1
7	1, 7, 1, 1, 5, 1
5	1, 1, 1, 1, 5, 1
	1, 1, 1, 1, 1, 1

L.C.M = 2 × 2 × 2 × 3 × 3 × 7 × 5 = 2520

So, the least number is = 2520 + 1 = 2521

5.

5	35, 45, 55
3	7, 9, 11
3	7, 3, 11
7	7, 1, 11
11	1, 1, 11
	1, 1, 1

L.C.M = 5 × 3 × 3 × 7 × 11 = 3465

So, the least number = 3465 + 17
= 3482

6.

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

L.C.M = 2 × 2 × 2 × 5 × 3 × 7 = 840

Required no. = L.C.M + Remainder
= 840 + 3 = 843

7.

2	74, 104, 108, 206
2	37, 52, 54, 103
2	37, 26, 27, 103
3	37, 13, 27, 103
37	37, 13, 9, 103
3	1, 13, 9, 103
3	1, 13, 3, 103
13	1, 13, 1, 103
103	1, 1, 1, 103
	1, 1, 1, 1

L.C.M = 2 × 2 × 2 × 3 × 37 × 3 × 3 × 13 × 103 = 10701288

Least number = 10701288

8.

3	15, 16, 18, 20
3	5, 16, 6, 20
5	5, 16, 2, 20
2	1, 16, 2, 4
2	1, 8, 1, 2
2	1, 4, 1, 1
2	1, 2, 1, 1
	1, 1, 1, 1

L.C.M $= 3 \times 3 \times 5 \times 2 \times 2 \times 2 \times 2 = 720$

Five digit number $= 10080$

9.

3	9, 11, 13
3	3, 11, 13
11	1, 11, 13
13	1, 1, 13
	1, 1, 1

L.C.M $= 3 \times 3 \times 11 \times 13 = 1287$

$$\begin{array}{r} 1294 \\ -1287 \\ \hline \end{array}$$

Required number $\quad 0007$

10.

5	5, 7, 9
3	1, 7, 9
3	1, 7, 3
7	1, 7, 1
	1, 1, 1

L.C.M $= 5 \times 3 \times 3 \times 7 = 315$

$$\begin{array}{r} 319 \\ -315 \\ \hline \end{array}$$

Required number $= \quad 4$

Exercise 4.7

1. (a) 852, 1491

$$852\overline{)1491}(1$$
$$\underline{852}$$
$$639\overline{)852}(1$$
$$\underline{639}$$
$$213\overline{)639}(3$$
$$\underline{639}$$
$$0$$

H.C.F of 852 and 1491 = 213

Now, L.C.M of 852, 1491

2	852, 1491
2	426, 1491
3	213, 1491
7	71, 497
71	71, 71
	1, 1

L.C.M of 852 and 1491 $= 2 \times 2 \times 3 \times 7 \times 71 = 5964$

So, product of two numbers
$$= \text{H.C.F} \times \text{L.C.M}$$
$$= 213 \times 5964 = 1270332 \text{ proved}$$

(b) to (d) : - Do same as above part.

2. (a) 145, 232

$$145\overline{)232}(1$$
$$\underline{145}$$
$$87\overline{)145}(1$$
$$\underline{87}$$
$$58\overline{)87}(1$$
$$\underline{58}$$
$$29\overline{)58}(2$$
$$\underline{58}$$
$$0$$

H.C.F $= 29$

$$\text{L.C.M} = \frac{\text{Product of two number}}{\text{H.C.F}}$$
$$= \frac{145 \times 232}{29}$$

L.C.M $= 1160$

(b) 117, 221

$$117\overline{)221}(1$$
$$\underline{117}$$
$$104\overline{)117}(1$$
$$\underline{104}$$
$$13\overline{)104}(8$$
$$\underline{104}$$
$$0$$

H.C.F $= 13$

$$\text{L.C.M} = \frac{\text{Product of two number}}{\text{H.C.F}}$$
$$= \frac{117 \times 221}{13}$$

L.C.M $= 1989$

(c) 861, 1353

$861\overline{)1353}(1$
$\quad\underline{861}$
$\quad492\overline{)861}(1$
$\quad\quad\underline{492}$
$\quad\quad369\overline{)492}(1$
$\quad\quad\quad\underline{369}$
$\quad\quad\quad123\overline{)369}(3$
$\quad\quad\quad\quad\underline{369}$

H.C.F = 123 $\quad\quad 0$

$L.C.M = \dfrac{\text{Product of two number}}{\text{H.C.F}}$

$= \dfrac{861 \times 1353}{123}$

L.C.M = 9471

(d) 693, 1078

$693\overline{)1078}(1$
$\quad\underline{693}$
$\quad385\overline{)693}(1$
$\quad\quad\underline{385}$
$\quad\quad308\overline{)385}(1$
$\quad\quad\quad\underline{308}$
$\quad\quad\quad77\overline{)308}(4$
$\quad\quad\quad\quad\underline{308}$

H.C.F = 77 $\quad\quad 0$

$L.C.M = \dfrac{\text{Product of two number}}{\text{H.C.F}}$

$= \dfrac{693 \times 1078}{77} = 9702$

(e) 2923, 3239

$2923\overline{)3239}(1$
$\quad\underline{2923}$
$\quad316\overline{)2923}(9$
$\quad\quad\underline{2844}$
$\quad\quad79\overline{)316}(4$
$\quad\quad\quad\underline{316}$

H.C.F = 79 $\quad\quad 0$

$L.C.M = \dfrac{\text{Product of two number}}{\text{H.C.F}}$

$= \dfrac{2923 \times 3239}{79}$ L.C.M = 119843

3. $L.C.M = \dfrac{\text{Product of two number}}{\text{H.C.F}}$

$L.C.M = \dfrac{2250}{5} = 450$

4. Product of two number = 2200
   L.C.M = 440

   $H.C.F = \dfrac{2200}{440} = 5$

5. H.C.F = 23 L.C.M = 1449
   One number = 161

   Other no. $= \dfrac{\text{H.C.F} \times \text{L.C.M}}{\text{One number}}$

   $= \dfrac{23 \times 1449}{161} = 207$

6. H.C.F = 5 L.C.M = 1955
   One number = 115

   Other no. $= \dfrac{\text{H.C.F} \times \text{L.C.M}}{\text{One number}}$

   $= \dfrac{5 \times 1955}{115} = 85$

7. $L.C.M = \dfrac{\text{Product of two number}}{\text{H.C.F}}$

   $= \dfrac{18732}{2} = 9366$

8.

3	15, 20, 24, 32, 36
3	5, 20, 8, 32, 12
5	5, 20, 8, 32, 4
2	1, 4, 8, 32, 4
2	1, 2, 4, 16, 2
2	1, 1, 2, 8, 1
2	1, 1, 1, 4, 1
2	1, 1, 1, 2, 1
	1, 1, 1, 1, 1

L.C.M = 3 × 3 × 5 × 2 × 2 × 2 × 2 × 2 = 1440

The required least number is 1440

9.

3	9, 12, 15, 18, 24
3	3, 4, 5, 6, 8
2	1, 4, 5, 2, 8
2	1, 2, 5, 1, 4
2	1, 1, 5, 1, 2
5	1, 1, 5, 1, 1
	1, 1, 1, 1, 1

L.C.M $= 3 \times 3 \times 2 \times 2 \times 2 \times 5 = 360$
Required five digit no. $= 360 \times 277$
$= 99720$

10.

3	9, 12, 15
3	3, 4, 5
2	1, 4, 5
2	1, 2, 5
5	1, 1, 5
5	1, 1, 1

L.C.M $= 3 \times 3 \times 2$
$\times 2 \times 5 = 180$ m
$= \dfrac{180}{60} = 3$ hours

So, the bells will ring together after 3 hours.

11.

5	25, 40, 60
5	5, 8, 12
2	1, 8, 12
2	1, 4, 6
2	1, 2, 3
3	1, 1, 3
	1, 1, 1

L.C.M $= 5 \times 5 \times 2$
$\times 2 \times 2 \times 3 = 600$
Least no. $= 600 + 9$
$= 609$

12.

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

L.C.M $= 2 \times 2 \times 2 \times 3 \times 3 \times 3$
$= 432$

So, the traffic lights change again simultaneously after 432 seconds or 7 min 12 sec.

Integers
Exercise - 5

1. (a) An increase $87 = +87$
A decrease of $87 = -87$
(b) Gaining ₹ 85 $\Rightarrow$ Losing ₹ 85
(c) Loss ₹ 1009 $\Rightarrow$ Gain ₹ 1009
(d) 100°C below freezing point $\Rightarrow$ 100°C above freezing point

(e) 1600 metre above sea level $\Rightarrow$ 1600 metre below sea level
(f) Withdraw of ₹ 5555 $\Rightarrow$ Deposit of ₹ 5555

2. Use '+' or '–' sign :
(a) A gain of ₹ 1200 $= +₹ 1200$
(b) A loss of ₹ 472 $= -₹ 472$
(c) 1000 metre below sea level $= -1000$ m
(d) 17°C below freezing point $= -17°C$
(e) Decrease of $49 = -49$
(f) Deposit of ₹ 900 $= +₹ 900$
(g) Withdraw of ₹ 777 $= -₹ 777$
(h) Increase of pay scale = + pays scale

3. Mark on number line :
(a) -10
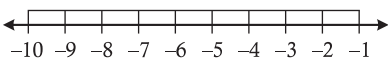
(b) -2
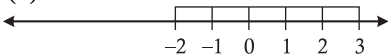
(c) 2

(d) -8
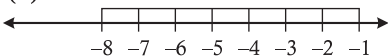
(e) 5

(f) 14
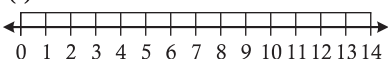
(g) -3
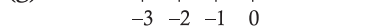
(h) 0

4. Which is larger?
(a) -3 $\boxed{>}$ -4 (b) -5 $\boxed{>}$ -10
(c) 5 $\boxed{<}$ 10 (d) 14 $\boxed{>}$ -14
(e) 0 $\boxed{<}$ -16 (f) 0 $\boxed{<}$ 1
(g) -472 $\boxed{<}$ -876

(h) -7777 $\boxed{<}$ -77

(i) -876 $\boxed{<}$ 476

5. **Which is smaller?**
(a) -16 (b) -10 (c) -1472 (d) 33 (e) -1 (f) -10 (g) -14752356897 (h) -15 (i) -16

6. **Give the opposite of :**
(a) Increase of water. (b) decrease in population. (c) Earning money. (d) Coming from north-east. (e) 400 A.D.(f) Rise of temperature. (g) Go down.

7. **Indicate as integers :**
(a) $+13°C$ (b) $-15°C$ (c) $-₹200$ (d) $+₹50$ (e) $+1775$ metres

8. **Which is right on the number line?**
(a) -1 (b) 7 (c) 3 (d) -5 (e) 19 (f) 25

9. (a) $-1, -2-3, -4, -5, -6, -7, -8, -9$, (b) $1, 2, 3, 4, 5$ (c) $7, 8$ (d) $4, 3, 2, 1, 0, -1, -2, -3, -4$ (e) $-434, -$

$435, -436, -437, -438, -439$ (f) $-9, -10, -11, -12, -13, -14$

10. (a) 10 $\boxed{>}$ -14 (b) -99 $\boxed{>}$ -120
(c) 40 $\boxed{>}$ -140
(d) 4444 $\boxed{>}$ -5555
(e) -111 $\boxed{<}$ -110 (f) $0\boxed{>}-50$

11. **Write in increasing order :**
(a) $-25, -10, -5, -15, -20, -105$
(b) $-112, -16, -15, -11, 0, 1, 100$
(c) $-400, -300, -200, 200, 300, 400$ (d) $-5000, -4000, -3000, 1000, 2000$

12. **Write in decreasing order :**
(a) $100, 10, 8, 5, 0, -5, -6, -100$
(b) $15, 4, 3, -2, -8, -20, -25$
(c) $700, 600, 549, -549, -600, -700$ (d) $9, 5, 1, -13, -17, -22, -26$

13. **Write the absolute value :**
(a) 1005 (b) 771 (c) 500 (d) 506 (e) 450 (f) 375 (g) 173 (h) 206

---

14. (a) 4 More than -8

$-8 + 4 = -4$

$-9 \quad -8 \quad -7 \quad -6 \quad -5 \quad -4 \quad -3 \quad -2 \quad -1 \quad 0$

(b) 6 more than 10

$10 + 6 = 16$

$0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10 \quad 11 \quad 12 \quad 13 \quad 14 \quad 15 \quad 16 \quad 17$

(c) 3 more than -18

$-18 + 3 = -15$

$-18 \quad -17 \quad -16 \quad -15 \quad -14 \quad -13 \quad -12 \quad -11 \quad -10 \quad -9 \quad -8 \quad -7 \quad -6 \quad -5 \quad -4 \quad -3 \quad -2 \quad -1 \quad -0$

(d) 4 less than -20

$-20 - 4 = -24$

$-25 -24 -23 -22 -21 -20 -19 -18 -17 -16 -15 -14 -13 -12 -11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 -0$

(e) 8 less than 6

$6 - 8 = -2$
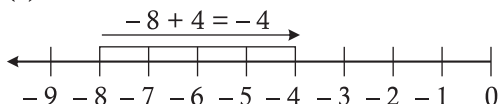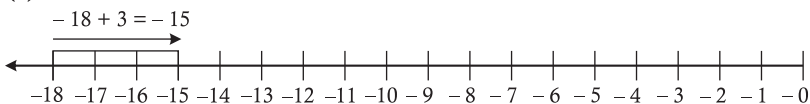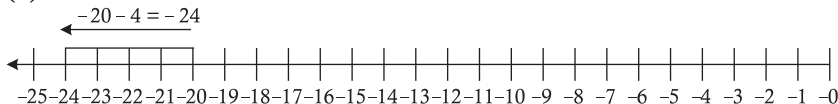
$-4 \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6$
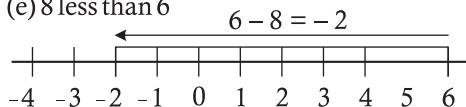
(f) Do same as above part.

15. (a) False (b) False (c) True (d) True (e) True (f) True (g) True

16. (a) $-19, -18, -17, -16, -15, -14, -13, -12$ (b) $-1, -2, -3, -4, -5$ (c) $-$

$26, -27, -28, -29, -30, -31, -32$
(d) Successor of $-121 = -121 + 1$
$= -120$
Predecessor of $-121 = -121 - 1$
$= -122$

Exercise - 5.2

1. (a) $10 + (-10) = 0$

$\begin{array}{cccccccccccc} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 \end{array}$

(b) $(-4) + 6 = 2$

$-6 -5 -4 -3 -2 -1 \quad 0 \quad 1 \quad 2 \quad 3$

(c) to (f) :- Do same as above part.

(g) $3 + (-4) + (-2) = -3$

$-4 -3 -2 -1 \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5$

(h) $(-2) + (-3) + (-4) = -9$

$-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 \quad 0$
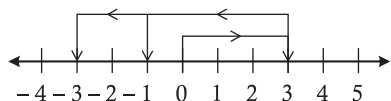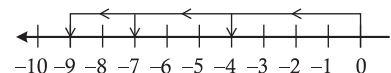
2. (a) $-4 -8 = \boxed{-12}$
(b) $-4 + 9 = \boxed{5}$
(c) $-18 + (-200) = \boxed{-218}$
(d) $-100 - 99 = \boxed{-199}$
(e) $-8 - 9 - 10 = \boxed{-27}$
(f) $119 - 19 - 100 = 119 - 119 = \boxed{0}$
(g) $0 + (-9) = \boxed{-9}$
(h) $0 - 3 + 3 = \boxed{0}$

3. **Add the following :**
(a) $-472 + 12 = -460$
(b) $333 + (-433) = -100$
(c) $200 + (-460) = -260$
(d) to (h) Do as the same above

4. **Find the sum of the following :**
(a) $432 + (-433)$
$432 - 433 = -1$
(b) to (e) Do as the same above

5. **Find the additive inverse :**
(a) $+87$ (b) -1183 (c) $+560$ (d) 0 (e) $+100008$ (f) -3065

6. (a) Successor $= -499 + 1 = -498$

Predecessor $= -499 - 1 = -500$
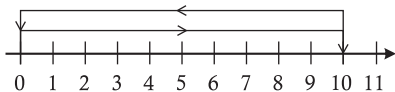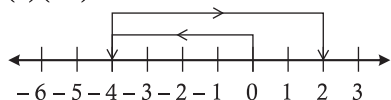(b) Successor $= -398 + 1 = -397$
Predecessor $= -398 - 1 = -399$
(c) Successor $= 0 + 1 = 1$
Predecessor $= 0 - 1 = -1$
(d) Successor $= -6262 + 1 = -6261$
Predecessor $= -6262 - 1 = -6263$
(e) Successor $= 9655 + 1 = 9656$
Predecessor $= 9655 - 1 = 9654$
(f) Successor $= -1600 + 1 = -1599$
Predecessor $= -1600 - 1 = -1601$

7. **Find the integer of x :**
(a) -1 (b) -9 (c) 10 (d) 20

8. Distance between the train and Delhi $= 190 - 160 = 30$ km

9. (a) $(-4) + (-5) + (-6) + (-8) + 6$
$= -23 + 6 = -17$
(b) $87 + (-43) + (-92) + (-10)$
$= 87 + (-145)$
$= 87 - 145 = -58$
(c) $(-432) + (-265) + (-49) + 125$
$= -746 + 125 = -621$
(d) $5622 + (-5623) + (-38) + 100$
$= 5722 - 5661 = 61$

10. Total lost money $= 90 + 30 + 140 + 78 = ₹ 338$
Found money $= ₹ 300$
Net loss $= 300 - 338 = -38$
Or ₹ 38 loss

Exercise - 5.3

1. **Subtract :**
(a) $-40 - 20$ (b) $-81 - 36$
$= -60$ $\quad -117$
(c) $-249 - 63$ (d) $-860 + 425$
$= -312$ $\quad -435$
(e) $88 - (-1596)$
$= 88 + 1596$
$= 1684$
(f) $256 - (-862)$
$= 256 + 862$
$= 1118$
(g) $-397 - (-5876)$
$= -397 + 5876$
$= 5479$
(h) $-245 - 6240$
$= -6485$

(i) $86539 - 3012$

= 83527

(j) $0 - 546$

$= -546$

(k) $-0 - (-4562)$

$= 0 + 4562$

$= 4562$

(l) $0 - (-688)$

$= +688$

2. $-48 - (546 + 920)$

$= -48 - (1466)$

$= -48 - 1466$

$= -1514$

3. $-5625 - (-1549 - 488)$

$= -5625 - (-2037)$

$= -5625 + 2037$

$= -3588$

4. $864 - (4261) + (-2391)$

$= 864 - (4261 - 2391)$

$= -1006$

5. $142 - (-99 - 426)$

$= 667$

6. $14 - (-26 + 762)$

$= -722$

7. $-89 - (-95) + (-46)$

$= -89 + 95 - 46$

$= 6 - 46$

$= -40$

8. (a) $[47 - (-9)] + [49 - (-38)]$

$[47 + 9] + [49 + 38]$

$= 56 + 87$

$= 143$

(b) $[-19 - (-18)] + [-57 - (-88)]$

$[-19 + 18] + [-57 + 88]$

$= -1 + 31$

$= 30$

(c) $[-122 - (-225)] - [-322 - (-428)]$

$[-122 + 225] - [-322 + 428]$

$= 103 - 106 \quad = -3$

9. **Find :**

(a) $44 - (82)$

$= 82 - 44$

$-38 \neq 38$

They are not equal.

(b) $-256 + 488$

$= -488 + 256$

$-232 \neq -232$

They are not equal.

10. Sum of two integers $= -45$

One number $= 426$

So, the other number $= -45 - 426$

$= -471$

11. The other number $= 840 - (-1426)$

$= 840 + 1426$

$= 2266$

12. (a) $-8 + (-17) = -25$

(b) $-12 - 8 = (-20)$

(c) $(-20) + (-48) = -68$

13. $b =$ successor of a

$\therefore b = a + 1$

So, $a - b = a - (a + 1) = -1$

14. $a =$ predecessor of b

$\therefore a = b - 1$

So, $a - b = b - 1 - b = -1$

15. False

Fractions

Exercise - 6.1

1. (a) $\dfrac{2}{3}$ (b) $\dfrac{11}{20}$ (c) $\dfrac{2}{4}$ (d) $\dfrac{3}{7}$

2. (a) $\dfrac{5}{27}$ (b) $\dfrac{6}{29}$ (c) $\dfrac{10}{24}$ (d) $\dfrac{16}{31}$

3. (a) $\dfrac{3}{6}$ (b) $\dfrac{5}{14}$ (c) $\dfrac{3}{12}$ (d) $\dfrac{5}{7}$

4. 1 hour = 60 minutes

$$\frac{20}{60} = \frac{1}{3}$$

5. 1 year = 365 days

So fraction = $\frac{31}{365}$

6. Aman had 25 litres of milk.
Sold milk = 19 litres
Remaining milk = 25 – 19 = 6 litres

So, the required fraction = $\frac{6}{25}$

7. Total frocks of Renu = 3
Dye frocks = 2

So, the required fraction = $\frac{2}{3}$

8. ∴ 1 day = 24 hours

So, $\frac{6}{24} = \frac{1}{4}$

Exercise - 6.2

1. Proper fractions = $\frac{5}{8}, \frac{5}{6}, \frac{1}{2}, \frac{18}{20}$

2. Improper fractions = $\frac{14}{11}, \frac{7}{4}, \frac{17}{16}, \frac{20}{19}$

3. (a) $\frac{57}{10}$ (b) $\frac{67}{9}$ (c) $\frac{-45}{7}$ (d) $\frac{197}{17}$

4. Mixed fraction

$2\frac{1}{6}, 2\frac{5}{12}, 4\frac{5}{6}, 3\frac{6}{7}$

5. (a) $2\frac{2}{5}$ (b) $6\frac{8}{9}$ (c) $4\frac{5}{7}$ (d) $8\frac{1}{11}$

Exercise - 6.3

1. (a) $\frac{9}{12} < \frac{11}{12}$ (b) $\frac{4}{7} < \frac{5}{7}$ (c) $\frac{6}{15} > \frac{2}{5}$

(d) $\frac{7}{9} > \frac{13}{18}$ (e) $\frac{16}{19} > \frac{12}{57}$ (f) $\frac{7}{16} < \frac{5}{8}$

2. (a) $\frac{10}{50} = \frac{1}{5}$ (b) $\frac{16}{54} = \frac{8}{27}$ (c) $\frac{35}{49} = \frac{5}{7}$

(d) $\frac{144}{1600} = \frac{9}{100}$ (e) $\frac{105}{500} = \frac{21}{100}$

3. **Ascending order :**

(a) $\frac{3}{8}, \frac{4}{8}, \frac{5}{8}, \frac{7}{8}$ (b) $\frac{3}{12}, \frac{6}{12}, \frac{9}{12}, \frac{13}{12}$

(c) $\frac{9}{8}, \frac{9}{6}, \frac{9}{5}, \frac{9}{2}$

(d) The given fractions are unlike fractions.
Therefore, first we convert them into like fractions.
L.C.M of 9, 5, 11 and 11 = 3 × 3 × 5 × 11 = 495
Now making the denominators of all fractions 495.

$$\frac{4}{9} = \frac{4 \times 55}{9 \times 55} = \frac{220}{495}$$

$$\frac{4}{5} = \frac{4 \times 99}{5 \times 99} = \frac{396}{495}$$

$$\frac{4}{11} = \frac{4 \times 45}{11 \times 45} = \frac{180}{495}$$

$$\frac{5}{11} = \frac{5 \times 45}{11 \times 45} = \frac{225}{495}$$

Since, 180 < 220 < 225 < 396

Hence, $\frac{180}{495} < \frac{220}{495} < \frac{225}{495} < \frac{396}{495}$

Thus, $\frac{4}{11} < \frac{4}{9} < \frac{5}{11} < \frac{4}{5}$ is the required ascending order.

4. (a) $\frac{7}{6}, \frac{4}{6}, \frac{2}{6}, \frac{1}{6}$ (b) $\frac{10}{2}, \frac{10}{3}, \frac{10}{5}, \frac{10}{7}$

(c) $\frac{4}{5}, \frac{2}{12}, \frac{1}{2}, \frac{9}{10}$ are unlike fraction

So, L.C.M of 5, 12, 2 and 10 = 5 × 2 × 6 = 60
Now making the denominators of all fractions 60.

$$\frac{4}{5} = \frac{4 \times 12}{5 \times 12} = \frac{48}{60}$$

$$\frac{2}{12} = \frac{2 \times 5}{12 \times 5} = \frac{10}{60}$$

$$\frac{1}{2} = \frac{1 \times 30}{2 \times 30} = \frac{30}{60}$$

$$\frac{9}{10} = \frac{9 \times 6}{10 \times 6} = \frac{54}{60}$$

Since, 54 > 48 > 30 > 10

Therefore $\frac{54}{60} > \frac{48}{60} > \frac{30}{60} > \frac{10}{60}$

Thus, $\dfrac{9}{10} > \dfrac{4}{5} > \dfrac{1}{2} > \dfrac{2}{12}$ is the

required descending order.

(d) $\dfrac{4}{11}, \dfrac{2}{22}, \dfrac{5}{56}, \dfrac{7}{33}$ are unlike fraction

So, L.C.M of 11, 22, 56 and 33 =
$11 \times 3 \times 2 \times 7 \times 4 = 1848$
Now making the denominators of all fractions 1848.

$\dfrac{4}{11} = \dfrac{4 \times 168}{11 \times 168} = \dfrac{672}{1848}$

$\dfrac{2}{22} = \dfrac{2 \times 84}{22 \times 84} = \dfrac{168}{1848}$

$\dfrac{5}{56} = \dfrac{5 \times 33}{56 \times 33} = \dfrac{165}{1848}$

$\dfrac{7}{33} = \dfrac{7 \times 56}{33 \times 56} = \dfrac{392}{1848}$

Since, $672 > 392 > 168 > 165$

Hence, $\dfrac{672}{1848} > \dfrac{392}{1848} > \dfrac{168}{1848} > \dfrac{165}{1848}$

Thus, $\dfrac{4}{11} > \dfrac{7}{33} > \dfrac{2}{22} > \dfrac{5}{56}$ is the

required descending order.

Exercise - 6.4

1. (a) $\dfrac{7}{15} + \dfrac{11}{15} = \dfrac{7 + 11}{15} = \dfrac{18}{15} = \dfrac{6}{5}$

(b) $\dfrac{8}{11} + \dfrac{9}{11} = \dfrac{8 + 9}{11} = \dfrac{17}{11}$

(c) $\dfrac{3}{6} + \dfrac{2}{6} = \dfrac{3 + 2}{6} = \dfrac{5}{6}$

(d) $\dfrac{5}{9} + \dfrac{2}{9} = \dfrac{5 + 2}{9} = \dfrac{7}{9}$

(e) $\dfrac{6}{14} + \dfrac{7}{14} = \dfrac{6 + 7}{14} = \dfrac{13}{14}$

(f) $\dfrac{3}{17} + \dfrac{5}{17} = \dfrac{3 + 5}{17} = \dfrac{8}{17}$

2. (a) $\dfrac{13}{16} + \dfrac{5}{8} + \dfrac{1}{2}$

L.C.M of 16, 8, 2 is = 16

$= \dfrac{13 + 10 + 8}{16} = \dfrac{31}{16} = 1\dfrac{15}{16}$

(b) $\dfrac{1}{4} + \dfrac{5}{12} + \dfrac{1}{24}$

L.C.M of 4, 12, 24 is = 24

$= \dfrac{6 + 10 + 1}{24} = \dfrac{17}{24}$

(c) $\dfrac{1}{3} + \dfrac{5}{8} + \dfrac{11}{12}$

L.C.M of 3, 8, 12 is = 24

$= \dfrac{8 + 15 + 22}{24} = \dfrac{45}{24} = \dfrac{15}{8} = 1\dfrac{7}{8}$

(d) $\dfrac{1}{3} + \dfrac{1}{4} + \dfrac{1}{6}$

L.C.M of 3, 4, 6 is = 12

$= \dfrac{4 + 3 + 2}{12} = \dfrac{9}{12} = \dfrac{3}{4}$

(e) $\dfrac{1}{2} + \dfrac{2}{9} + \dfrac{1}{12}$

L.C.M of 2, 9, 12 is = 36

$= \dfrac{18 + 8 + 3}{36} = \dfrac{29}{36}$

(f) $\dfrac{1}{4} + \dfrac{5}{16}$

L.C.M of 4, 16 is = 16

$= \dfrac{4 + 5}{16} = \dfrac{9}{16}$

Exercise - 6.5

1. (a) $5\dfrac{5}{8} + 2\dfrac{2}{3}$

$= \dfrac{45}{8} + \dfrac{8}{3}$

L.C.M of 8, 3 is = 24

$= \dfrac{135 + 64}{24} = \dfrac{199}{24} = 8\dfrac{7}{24}$

(b) $5\dfrac{5}{9} + 3\dfrac{7}{8} + 1\dfrac{3}{8} = \dfrac{50}{9} + \dfrac{31}{8} + \dfrac{11}{8}$

L.C.M of 9, 8, 8 is = 72

$= \dfrac{400 + 279 + 99}{72} = \dfrac{778}{72}$

$= \dfrac{389}{36} = 10\dfrac{29}{36}$

(c) $1\dfrac{4}{5} + 7\dfrac{7}{10} + 5\dfrac{4}{15} = \dfrac{9}{5} + \dfrac{77}{10} + \dfrac{79}{15}$

L.C.M of 5, 10, 15 is = 30

$= \dfrac{54 + 231 + 158}{30} = \dfrac{443}{30} = 14\dfrac{23}{30}$

(d) $\dfrac{1}{12} + \dfrac{5}{3} + 4\dfrac{5}{8} = \dfrac{1}{12} + \dfrac{5}{3} + \dfrac{37}{8}$

L.C.M of 12, 3, 8 is = 24

$= \dfrac{2 + 40 + 111}{24} = \dfrac{153}{24} = \dfrac{51}{8} = 6\dfrac{3}{8}$

2. (a) $\dfrac{3}{8} + 1\dfrac{1}{4} = \dfrac{3}{8} + \dfrac{5}{4}$

L.C.M of 8, 4 is = 8

$= \dfrac{3 + 10}{8} = \dfrac{13}{8} = 1\dfrac{5}{8}$

(b) $\dfrac{1}{6} + \dfrac{19}{8}$

L.C.M of 6, 8 is = 24

$= \dfrac{4 + 57}{24} = \dfrac{61}{24} = 2\dfrac{13}{24}$

(c) $2\dfrac{3}{8} + 1\dfrac{1}{12} = \dfrac{19}{8} + \dfrac{13}{12}$

L.C.M of 8, 12 is = 24

$= \dfrac{57 + 26}{24} = \dfrac{83}{24} = 3\dfrac{11}{24}$

(d) $2\dfrac{1}{4} + 3\dfrac{1}{6} = \dfrac{9}{4} + \dfrac{19}{6}$

L.C.M of 4, 6 is = 12

$= \dfrac{27 + 38}{12} = \dfrac{65}{12} = 5\dfrac{5}{12}$

Exercise - 6.6

1. (a) $\dfrac{15}{17} - \dfrac{13}{17}$ (b) $\dfrac{10}{11} - \dfrac{4}{11}$

$= \dfrac{15 - 13}{17} = \dfrac{2}{17}$ $= \dfrac{10 - 4}{11} = \dfrac{6}{11}$

(c) $\dfrac{13}{15} - \dfrac{10}{15}$ (d) $\dfrac{13}{20} - \dfrac{8}{20}$

$= \dfrac{13 - 10}{15}$ $= \dfrac{13 - 8}{20}$

$= \dfrac{3}{15} = \dfrac{1}{5}$ $= \dfrac{5}{20} = \dfrac{1}{4}$

2. (a) $\dfrac{1}{2} - \dfrac{1}{3}$ (b) $\dfrac{1}{3} - \dfrac{1}{5}$

$= \dfrac{3 - 2}{6} = \dfrac{1}{6}$ $= \dfrac{5 - 3}{15} = \dfrac{2}{15}$

(c) $\dfrac{3}{4} - \dfrac{1}{2}$ (d) $\dfrac{8}{15} - \dfrac{7}{20}$

$= \dfrac{3 - 2}{4} = \dfrac{1}{4}$ $= \dfrac{32 - 21}{60} = \dfrac{11}{60}$

Decimals

Exercise 7.1

1. $0.8 = \dfrac{8}{10}$ (b) $4.8 = \dfrac{48}{10}$

(c) $16.3 = \dfrac{163}{10}$ (d) $120.7 = \dfrac{1207}{10}$

2. (a) $\dfrac{6}{12} = 12\overline{)60}(.5$

$\qquad\quad \dfrac{60}{\ \ 0}$

(b) $\dfrac{10}{11} = 11\overline{)100}(.909$

$\qquad\quad \dfrac{99}{100}$

$\qquad\qquad \dfrac{99}{1}$

(c) $\dfrac{2}{10} = 10\overline{)20}(.2$

$\qquad\quad \dfrac{20}{\ \ 0}$

(d) $\dfrac{6}{8} = 8\overline{)60}(.75$

$\qquad\quad \dfrac{56}{40}$

$\qquad\quad \dfrac{40}{\ \ 0}$

(e) $\dfrac{4}{6} = 6\overline{)40}(0.66$

$\qquad\quad \dfrac{36}{40}$

$\qquad\quad \dfrac{36}{4}$

3. (a) $25\dfrac{3}{10}$ (b) $45\dfrac{7}{10}$

     $=\dfrac{253}{10}=25.3$ $=\dfrac{457}{10}=45.7$

(c) $11\dfrac{9}{10}$ (d) $38\dfrac{8}{10}$

     $=\dfrac{119}{10}=11.9$ $=\dfrac{388}{10}=38.8$

4. (a) $0.4=\dfrac{4}{10}=\dfrac{2}{5}$ (b) $0.8=\dfrac{8}{10}=\dfrac{4}{5}$

(c) $0.3=\dfrac{3}{10}$ (d) $0.6=\dfrac{6}{10}=\dfrac{3}{5}$

(e) $2.5=\dfrac{25}{10}=\dfrac{5}{2}=2\dfrac{1}{2}$

5. (a) $\dfrac{4}{10}=0.4$ (b) 6.5 (c) 29.6 (d) 17.3

6. (a) Thirteen point seven
(b) Thirty nine point three
(c) Seven point nine
(d) Two hundred fifteen point seven

Exercise - 7.2

1. (a) $\dfrac{21}{10}=2.1$ (b) $\dfrac{131}{10}=13.10$

(c) $\dfrac{6}{100}=0.06$ (d) $\dfrac{412}{100}=4.12$

2. (a) $0.6=\dfrac{6}{10}=\dfrac{3}{5}$ (b) $1.7=\dfrac{17}{10}$

(c) $3.9=\dfrac{39}{10}$ (d) $2.14=\dfrac{214}{100}=\dfrac{107}{50}$

3. (a) 3.720, 6.100, 152.923
(b) 2.930, 70.800, 3.274
(c) 7.800, 3.990, 1.242
(d) 16.670, 18.360, 2.007
(e) 35.60, 2.91, 3.46
(f) 2.6000, 6.5109, 676.0000

4. (a) 1.734, 2.543, 11.364
(c) 29.8, 14.6, 13.7
(e) 2.77, 31.14, 66.21

Exercise - 7.3

(a) $6.32=6+\dfrac{3}{10}+\dfrac{2}{100}=6+0.3+0.02$

(b) $9.68=9+\dfrac{6}{10}+\dfrac{8}{100}=9+0.6+0.08$

(c) $12.084=12+\dfrac{8}{100}+\dfrac{4}{1000}=10+2+0.08+0.004$

(d) $87.837=87+\dfrac{8}{10}+\dfrac{3}{100}+\dfrac{7}{1000}$
$=80+7+0.8+0.03+0.007$

2. (a) 56.79   (b) 4.297
(c) 4.302   (d) 68.037

Exercise - 7.4

1. (a) $1.73<3.84$ (b) $5.432>4.734$
(c) $32.3>13.05$ (d) $.732<.734$
(e) $21.6185<21.764$
(f) $38.35>8.29$

2. (a) $1.312<2.542<7.312<8.501$
(b) $0.76<0.8<1.74<2$
(c) $2.14<3.68<4.27<5.66$
(d) $0.63<7.241<8.325<19.621$

3. (a) $41.101>41.001>40.101>40.011$
(b) $444.42>44.41>4.442>4.44$
(c) $0.342>0.032>0.023>0.0032$
(d) $13.5>8.464>7.5>2.73$

Exercise - 7.5

1. (a) $.8+.4=.12$ (b) $.8+.7=.15$
(c) $.06+.05=.11$ (d) $.20+.12=.32$

2. (a)
```
  0 . 3
+ 0 . 5
  0 . 8
```
(b)
```
  0 . 6
+ 0 . 3
  0 . 9
```
(c)
```
  0 . 8
+ 0 . 1
  0 . 9
```
(d)
```
  0 . 9
+ 0 . 3
  1 . 2
```
(e)
```
  0 . 6 5
+ 3 . 8 7
  4 . 5 2
```
(f)
```
  1 0 3 . 2 8 6
  0 0 6 . 9 0 0
  0 0 9 . 3 5 0
+ 0 4 0 . 0 7 0
  1 5 9 . 6 0 6
```
(g)
```
  1 3 . 7 3 0
  0 2 . 4 0 0
+ 0 6 . 3 2 4
  2 2 . 4 5 4
```

3. (a)
```
  0 . 8
- 0 . 5
  0 . 3
```
(b)
```
  1 . 3
- 0 . 6
  0 . 7
```
(c)
```
  2 . 5
- 0 . 8
  1 . 7
```

(d)
$$\begin{array}{r} 1\,8\,.\,6\,7 \\ -\,2\,.\,9\,7 \\ \hline 1\,5\,.\,7\,0 \end{array}$$

(e)
$$\begin{array}{r} 5\,2\,.\,3\,1 \\ -\,2\,7\,.\,9\,6 \\ \hline 2\,4\,.\,3\,5 \end{array}$$

(f)
$$\begin{array}{r} 3\,7\,.\,0\,0 \\ -\,2\,8\,.\,2\,9 \\ \hline 0\,8\,.\,7\,1 \end{array}$$

(g)
$$\begin{array}{r} 5\,4\,.\,2\,3 \\ -\,2\,5\,.\,5\,0 \\ \hline 2\,8\,.\,7\,3 \end{array}$$

(h)
$$\begin{array}{r} 1\,0\,8\,.\,3\,0 \\ -\,6\,8\,.\,0\,9 \\ \hline 4\,0\,.\,2\,1 \end{array}$$

4. Total earning =
$$\begin{array}{r} ₹\,1\,2\,5\,.\,2\,5 \\ 1\,7\,2\,.\,5\,0 \\ +\,1\,6\,5\,.\,5\,0 \\ \hline 4\,6\,3\,.\,2\,5 \end{array}$$

5. Total distance =
$$\begin{array}{ll} 2\,5\,.\,2\,0\,0 & km \\ By\ bus = 1\,4\,2\,.\,5\,5\,0 & km \\ By\ train =+\,5\,2\,4\,.\,3\,2\,5 & km \\ \hline 6\,9\,2\,.\,0\,7\,5 & km \end{array}$$

By bus   = 1 4 2 . 5 5 0 km
By train =+ 5 2 4 . 3 2 5 km

6. Fruits weight =
$$\begin{array}{ll} 5\,.\,2\,5\,0 & kg \\ =-\,3\,.\,5\,0\,0 & kg \\ \hline 1\,.\,7\,5\,0 & kg \end{array}$$

Vegetable

Fruits are more in weight.

7.
$$\begin{array}{r} 8\,0\,.\,0\,0 \\ -\,5\,6\,.\,5\,0 \\ \hline 2\,3\,.\,5\,0 \end{array}$$

8.
$$\begin{array}{r} 9\,.\,4\,0\,0 \\ -\,6\,.\,2\,5\,0 \\ \hline 3\,.\,1\,5\,0 \end{array}$$

9.
$$\begin{array}{r} 1\,0\,0\,.\,0\,0 \\ -\,8\,4\,.\,5\,0 \\ \hline 1\,5\,.\,5\,0 \end{array}$$

10.
$$\begin{array}{r} 6\,5\,.\,4\,0 \\ -\,2\,4\,.\,6\,5 \\ \hline 4\,0\,.\,7\,5 \end{array}$$

Exercise - 7.6

1. (a) $5.8 \times 6 = 34.8$
   (b) $1.10 \times 100 = 110.00$

(c) $4.3 \times 1000 = 4300.0$
(d) $6.8 \times 11 = 74.8$
(e) $61.3 \times 4 = 2084.2$
(f) $11.3 \times 365 = 4124.5$
(g) $34.6 \times 396 = 13701.6$
(h) $19.17 \times 19 = 364.23$

Exercise - 7.7

1. (a) $16.8 \div 4$

$$4\overline{)16.8}(4.2$$
$$\underline{16}$$
$$8$$
$$\underline{8}$$
$$0$$

(b) $25.5 \div 5$

$$5\overline{)25.5}(5.1$$
$$\underline{25}$$
$$5$$
$$\underline{5}$$
$$0$$

(c) $173.4 \div 17$

$$17\overline{)173.4}(10.1788 \text{ or } 10.2$$
$$\underline{17}$$
$$30$$
$$\underline{17}$$
$$134$$
$$\underline{119}$$
$$150$$
$$\underline{136}$$
$$140$$
$$\underline{136}$$
$$4$$

(d) $2.24 \div 16$
$$= \frac{2.24}{1.6} = 1.4$$

(e) $7.83 \div 8.7$
$$= \frac{7.83}{8.70} = 0.9$$

(f) $0.408 \div 0.17$
$$= \frac{0.408}{0.170} = 2.4$$

2. Sum $\qquad$ = $\quad$ 3 0 . 6 4
   One of the number = $-$ 2 1 . 2 8
   Other number $\quad$ = $\quad\quad$ 9 . 3 6

3. Aditya has $\quad$ = $\quad$ ₹ 4 1 0 . 5 0
   Ravi has $\quad\quad$ = $-$₹ 3 1 6 . 2 5
   Difference $\quad$ = $\quad$ ₹ 9 4 . 2 5

   So, Aditya has ₹94.25 more than Ravi.

4. Rahul bought wheat $\quad$ = 1.50 kg
   Govind bought wheat = 7.25 kg
   Rakesh bought wheat = 18.00 kg
   Total amount of wheat = (1.50 + 7.25 + 18.00) kg = 26.75 kg.

5. A milkman supplies milk to
   One customer $\qquad$ = $\quad$ 3 . 5 l
   Second customer $\quad$ = $+$ 7 . 8 5 l
   Total supplied milk $\quad$ = 1 1 . 3 5 l

   Left milk = 11.50 − 11.35 = 0.15 l

6. One fancy dress cost = 50.50
   15 fancy dress cost $\quad$ = 50.50 × 15
   $\qquad\qquad\qquad$ = ₹ 757.50

7. The price of 25.3 kg mangoes = ₹ 243.81
   1 kg mangoes $= \dfrac{243.81}{25.3} = $ ₹ 9.636

8. Price of 1 m cloth = ₹ 45.50
   Price of 12.75 m cloth
   $\qquad\qquad$ = 45.50 × 12.75

   ```
       4 5.5 0
     × 1 2.7 5
     2 2 7 5 0
   3 1 8 5 0 ×
   9 1 0 0 × ×
   4 5 5 0 × × ×
   5 8 0.1 2 5 0
   ```

   So the price = 580.1250

9. Required length =
   $$\dfrac{\text{Area of rectangle}}{\text{Breadth}}$$
   $$= \dfrac{10.125}{1.8}$$

```
18) 10.125 (5.625
    9 0
    1 12
    1 08
      45
      36
      90
      90
       0
```

So, the required length = 5.625 cm.

Introduction of Algebra
Exercise - 8.1

1. (a) $x - 9$ $\quad$ (b) $y + 81$ $\quad$ (c) $x - y, y - x$

   (d) $x + y - xy$ $\quad$ (e) $\dfrac{1}{5}x(a+b)$

   (f) $3x(x+y)$ $\quad$ (g) $8x + \dfrac{1}{3}y$

   (h) $z - x$ $\qquad$ (i) $x + \dfrac{y}{19}$

   (j) $\dfrac{y}{z} + 12$ $\qquad$ (k) y^2

   (l) $\dfrac{x}{y+z}$

2. Passing marks of math $= x$
   One got 20 less than passing marks
   So, the marks he got $= (x - 20)$

3. (a) $4x \times 4x \times 4x$ .... 10 times
      Exponential form $= (4x)^{10}$
   (b) $m \times m \times m$ .... 25 times
      Exponential form $= (m)^{25}$
   (c) $9 \times x \times y \times x \times y \times x \times y$ ....
      5 times
      Exponential form $= 9\,x^5 y^5$
   (d) $3 \times z \times z \times z \times x \times x \times x \times y \times y \times p \times p$
      Exponential form $= 3z^3x^3y^2p^2$

4. (a) $6a^9x^3y^8 = 3 \times 2 \times a \times a$ 9
      time $\times x \times x \times x \times y \times y$ .... 8 time
   (b) $x^{18}y^{12}z^6 = x \times x$ .... 18 time $\times y$
      $\times y$ 12 times $\times z \times z$ ...... 6 time
   (c) $10a^3b^3x^3y^3 = 5 \times 2 \times a \times a \times a \times b \times b \times b \times x \times x \times x \times y \times y \times y$

(d) $9y^5 = 3 \times 3 \times y \times y \times y \times y \times y$

(e) $x^{10}y^{10} = x \times x \times x$ .... 10 times
$\times y \times y \times y$ .... 10 times

5. (a) Cost price = Selling price − profit

(b) Amount = Principal + Interest

(c) Father's age − 10 = 4 (Son's age) − 10

(d) Distance = 5 × Length

(e) $10x + y = 10y + x + 45$

Exercise - 8.2

1. (a) Binomial
   (b) Binomial
   (c) Monomial
   (d) Trinomial
   (e) Quadrinomial
   (f) Quadrinomial
   (g) Binomial
   (h) Binomial

2. **Like terms are :**
   (a) $-x^2y^2, -4x^2y^2, -8x^2y^2$
   (b) $-5y^2x^2, -6y^2x^2$
   (c) $-38z^3x^3y^3, \ 9z^3x^3y^3$

3. **Unlike terms are :**
   (a) $-19xy, -28y^2x$
   (b) $16x^2y, \ 23x^2y^2$

4. (a) $-2y, -2yz, -yz, 3y$
   (b) $4, 5y, 3z - 49y, 33p, 33$

5. Co-efficient of z
   $3xy, pm, np, 10x^2y^2$

6. (a) $+19$ (b) $+45$ (c) $+\dfrac{4}{3}$ (d) $+\dfrac{5}{9}$
   (e) $-\dfrac{9}{18}$

7. (a) 1 (b) 2 (c) $\dfrac{4}{3}$ (d) -2 (e) $\dfrac{-40}{9}$

8. (a) $4x^5, -9x^4, -2x^3, x^2, x, 9$
   (b) $13xyz, -8x^3y^3, -5z^4, 9x^3, -25$

9. Polynomial → An expression which contains two or more than two terms is called polynomial.

Ex :- $x + y + z - xy - xz - yz - xyz$

Exercise - 8.3

1. If $x = 2, y = 4$

(a) $x + 4y$
   $= 2 + 4 \times 4$
   $= 2 + 16 = 18$

(b) $-x - y$
   $= -2 - 4$
   $= -6$

(c) $x^3 + y^3 - xy$
   $= (2)^3 + (4)^3 - 2 \times 4$
   $= 8 + 64 - 8$
   $= 64$

(d) $5x^2 - 4xy$
   $= 5(2)^2 - 4 \times 2 \times 4$
   $= 20 - 32$
   $= -12$

(e) $x^3 - y^3 - y^2$
   $= (2)^3 - (4)^3 + (4)^2$
   $= 8 - 64 + 16$
   $= 24 - 64$
   $= -40$

(f) $x^2 - y^2 - 2xy$
   $= (2)^2 + (4)^2 - 2 \times 2 \times 4$
   $= 4 + 16 - 16$
   $= 4$

(g) $2x + 3y$
   $= 2 \times 2 + 3 \times 4$
   $= 4 + 12$
   $= 16$

(h) $3y - 4x$
   $= 3 \times 4 - 4 \times 2$
   $= 12 - 8$
   $= 4$

2. **If $x = 1$ $y = 2$ and $z = 3$ find value :**

(a) $4x - 2y + 3z$
   $= 4 \times 1 - 2 \times 2 + 3 \times 3$
   $= 4 - 4 + 3 \times 3$
   $= 9$

(b) $x^3 - z^3 + y^3$

$= (1)^3 - (3)^3 + (2)^3$

$= 1 - 27 + 8$

$= 9 - 27$

$= -18$

(c) $3x^2 - 4y^3 + 2z^2$

$= 3(1)^2 - 4 \times (2)^3 + 2(3)^2$

$= 3 \times 1 - 4 \times 8 + 2 \times 9$

$= 3 - 32 + 18$

$= 21 - 32$

$= -11$

(d) $\dfrac{4x^2y^2z^2}{xyz} = \dfrac{4\,(1)^2 \times (2)^2 \times (3)^2}{1 \times 2 \times 3}$

$= \dfrac{4 \times 4 \times 9}{6} = \dfrac{144}{6} = 24$

(e) $2xy^2 - 2x^2y + 2y^2z + 2x^2z$

$= 2 \times 1 \times (2)^2 - 2\,(1)^2 \times 2 + 2 \times (2)^2 \times 3 + 2 \times (1)^2 \times 3$

$= 2 \times 4 - 2 \times 2 + 2 \times 4 \times 3 + 2 \times 1 \times 3$

$= 8 - 4 + 24 + 6$

$= 38 - 4 = 34$

(f) $12xy - 4yz - 3xz + 2x^2y + 2x^2y + 2x^2z + 2yz^2$

$= 12 \times 1 \times 2 - 4 \times 2 \times 3 - 3 \times 1 \times 3 + 2 \times 1 \times 2 + 2 \times 1 \times 2 + 2 \times 1 \times 3 + 2 \times 2 \times (3)^2$

$= 24 - 24 - 9 + 4 + 4 + 6 + 36$

$= 50 - 9 = 41$

(g) $x^y \, y^z \, z^{xy}$

$= x^2 \, y^3 \, z^{1 \times 2}$

$= (1)^2 \times (2)^3 \times 3^2$

$= 1 \times 8 \times 9 = 72$

(h) $x^2 + y^2 + z^2 + 2xy + 2xy + 2yz + 2xz - 2xyz$

$= x^2 + y^2 + z^2 + 4xy + 2yz + 2xz - 2xyz$

$= 1^2 + 2^2 + 3^2 + 4 \times 1 \times 2 + 2 \times 2 \times 3 + 2 \times 1 \times 3 - 2 \times 1 \times 2 \times 3$

$= 1 + 4 + 9 + 8 + 12 + 6 - 12$

$= 40 - 12 = 28$

(i) $(x^2 - z^2) + (x^2 - y^2) + (y^2 - z^2) + (z^2 - x^2) + (z^2 - y^2) + (y^2 - x^2)$

$= x^2 - z^2 + x^2 - y^2 + y^2 - z^2 + z^2 - y^2 + y^2 - x^2 = 0$

3. **If $m = -2 \ n = -1 = o = 3$ then find :**

(a) $m^3 + n^3 + 3mno$

$= (-2)^3 + (-1)^3 + 3 \times (-2) \times (-1) \times 3$

$= -8 - 1 + 18 = 18 - 9 = 9$

(b) $m^2 - n^2 - o^2 - mno$

$= (-2)^2 - (-1)^2 - (-3)^2 + (-2) \times (-1) \times 3$

$= 4 - 1 - 9 + 6$

$= 10 - 10 = 0$

(c) $2m^2 - n^2 + 3o^2$

$= 2(-2)^2 - (-1)^2 + 3(-3)^2$

$= 2 \times 4 - 1 + 27$

$= 8 - 1 + 27 = 34$

(d) $m - n - o$

$(-2) - (-1) - 3$

$= -2 + 1 - 3$

$= -5 + 1 = -4$

(e) $m^2 - n^2 - o^2$

$= (-2)^3 - (-1)^3 - (-3)^3$

$= -8 + 1 - 27$

$= -35 + 1 = -34$

(f) $3m^2n + 6mn^2 + 6m^2n^2$

$= 3(-2)^2 \times -1 + 6 \times -2\,(-1)^2 + 6(-2)^2\,(-1)^2$

$= -12 - 12 + 24$

$= -24 + 24$

$= 0$

4. (a) $2x + 4x - 6x$

$= 6x - 6x = 0$

(b) $7y + 3y - 2y$

$= 10y - 2y = 8y$

(c) $3x^2 + 6x^2 + 7x^2$

$= 16x^2$

(d) $9yz + 10zy$

$= 19yz$

(e) $6xyz - xyz + 9xyz - 11xyz$
$= 15xyz - 12xyz$
$= 3xyz$

(f) $9x^3 + 4x^3 + 7x^3 + 10x^3$
$= 26x^3 - 4x^3$
$= +22x^3$

(g) $x^2 + y^2 + 4x^2 + 2y^2 - 3x^2 - 8y^2$
$= 2x^2 - 5y^2$

(h) $3xy + 4xy - 8xy - 9xy$
$= 7xy - 17xy$
$= -10xy$

5. (a)
$$\begin{array}{r} 2x - 4y - 9z \\ 4x + 3y - 8z \\ -7x - 5y + 3z \\ \hline -x - 6y - 14z \end{array}$$

(b)
$$\begin{array}{r} x^2 - 4y^2 + 5xy \\ -\ 2x^2 + 3y^2 - 8xy \\ -\ 5x^2 + 9y^2 - 9xy \\ \hline 6x^2 + 8y^2 - 12xy \end{array}$$

(c)
$$\begin{array}{r} 9x^2 - 14xy - 45y^2 \\ -7x^2 + 5xy - 2y^2 \\ 8x^2 + xy - 8y^2 \\ \hline 10x^2 - 8xy - 55y^2 \end{array}$$

(d)
$$\begin{array}{r} 3xy - 9yz + 8xz \\ -\ 8xy + 11yz - 15xz \\ -\ 12xy + 6yz - 18xz \\ \hline -\ 17xy + 8yz - 25xz \end{array}$$

(e)
$$\begin{array}{r} 2x^2 - 3y^2 - 6xy \\ -\ 3x^2 + 5y^2 - 15xy \\ -\ 8x^2 + 7y^2 - 20xy \\ \hline -\ 9x^2 + 9y^2 - 41xy \end{array}$$

6. (a)
$$\begin{array}{r} 3x - 2y - 5z \\ -x - y - z \\ +8x + 4y + 8z \\ \hline 10x + y + 2z \end{array}$$

(b)
$$\begin{array}{r} 8x - 6xy + 5y \\ -6x - xy - 3y \\ -5x + 4xy + y \\ \hline -3x - 3xy + 3y \end{array}$$

(c)
$$\begin{array}{r} 3x^3 - 4x^2 + 8x - 9 \\ -6x^3 + 3x^2 - 7x - 6 \\ -\ x^2 + 4x^2 - 8x + 7 \\ \hline -4x^3 + 3x^2 - 7x - 8 \end{array}$$

(d)
$$\begin{array}{r} 3x^2 - 9xy + 6x^2 - 3xy^2 \\ +3x^2 + 5xy - y^2 + xy^2 \\ -\ x^2 - xy - 5y^2 + 3xy^2 \\ \hline +\ 5x^2 - 5xy + 10y^2 + xy^2 \end{array}$$

(e)
$$\begin{array}{r} x^3 + y^3 - z^3 + 3xyz \\ -x^3 - y^3 + z^3 - 3xyz \\ x^3 - y^3 - z^3 - 8xyz \\ \hline x^3 - y^3 - z^3 - 8xyz \end{array}$$

(f)
$$\begin{array}{r} x^4 + x^3 - x^2 + 6 \\ -5x^4 + 6x^3 + 7x^2 - 18 \\ 9x^4 - 3x^3 - 10x^2 + 20 \\ \hline 5x^4 + 4x^3 - 4x^2 + 8 \end{array}$$

(g)
$$\begin{array}{r} x^5 - x^4 - x^3 - x^2 - x \\ -3x^5 - 4x^4 - 5x^3 - 6x^2 - 7x \\ 8x^5 + 5x^4 + 6x^3 + 7x^2 + 8x \\ +4x^5 \\ \hline \end{array}$$

7. (a) $x - 3x = -2x$

(b) $-xy - (-4xy)$
$= -xy + 4xy$
$= +3xy$

(c) $15y - 4y$
$= 11y$

(d) $-8y^2 - 9y^2$
$= -17y^2$

(e) $18y^2 - 19y^2$
$= -y^2$

(f) $-17x^2 - 20x^2$
$= -37x^2$

8. **Subtract:**

(a) $(2a - 18b + 8c) - (5a + 7b - 3c)$
$= 2a - 18b + 8c - 5a - 7b + 3c$
$= -3a - 25b + 11c$

(b) $(m + n + p) - (-m - n - p)$
$= m + n + p + m + n + p$
$= 2m + 2n + 2p$

(c) $(2m^2 - 13\,n^2 + 3p^2)\ -(5m^2 - 5\,n^2 + 6p^2)$
$= 2m^2 - 13\,n^2 + 3p^2 - 5m^2 + 5n^2 - 6p^2$
$= -3m^2 - 8n^2 - 3p^2$

(d) $x^3 - 4x^2y - 8xy^2 - x^2 - 3x^2y - 4xy^2$
$= x^3 - x^2 - 7x^2y - 12xy^2$

(e) $(y^3 - 2xy^2 - 5x^2y) - (x^3 + 4x^2y + 7xy^2 - y^3)$
$= y^3 - 2xy^2 - 5x^2y - x^3 - 4x^2y - 7xy^2 + y^3$
$= 2y^3 - 9xy^2 - 9x^2y - x^3$

(f) $(9x^2y^2 - 8xy + 10) - (-11x^2y^2 - 9xy - 8)$
$= 9x^2y^2 - 8xy + 10 + 11x^2y^2 - 9xy + 8$
$= 20x^2y^2 - 17xy + 18$

(g) $5u + (-2t) + (-34) - (-25 + t + 6u)$
$= 5u - 2t - 34 + 25 - t - 6u$
$= -u - 3t - 9$

9. (a) $12a^3 - 13b^2 + 14c - 15 - 16a^3 + 12b^2 - 18a - 12 + 16a + 18$
$= -4a^3 - b^2 + 14c - 2a - 9$

(b) $3m^2 - mn + 6m - 4n + 5mn - 4m + 6m^2 + 3n$
$= 9m^2 + 4mn + 2m - n$

(c) $x^4 - 16x^3 + 12x - 17 + 17x^3 - x + 15x^2 + 2 - x^4$
$= x^3 + 15x^2 + 11x - 15$

(d) $-3x^4 - 4x^3 - 8x^2 - 9x + 3x^4 - 18x^3 - 6x^2 + 9x$
$= -22x^3 - 14x^2$

10. $(4x^2 - 6x + 3 - 6x^2 - 9x + 7) - (5x^2 - 10x + 8)$
$= -2x^2 - 15x + 10 - 5x^2 + 10x - 8$
$= -7x^2 - 5x + 2$

11. If $M = 7p^2 + 5pq - 9q^2$, $N = -4p^2 + pq + 5q^2$. and $P = 4q^2 - 3p^2 - 6pq$
show that $M + N + P = O$

$$\begin{array}{r} 7p^2 + 5pq - 9q^2 \\ -4p^2 + pq + 5q^2 \\ -3p^2 - 6pq + 4q^2 \\ \hline M + N + P = \qquad 0 \end{array}$$

12.
$$\begin{array}{r} 2x^2 + 3y^2 \\ 5x^2 - 2y^2 + xy \\ -6x^2 + y^2 - 5xy \\ \hline \text{Sum} = \quad x^2 + 2y^2 - 4xy \end{array}$$

Exercise - 8.4
Simplify :

1. $x - (y - 2x)$
$= x - y + 2x$
$= 3x - y$

2. $4x - (3y + 4y)$
$= 4x - 7y$

3. $(x^2 + y^2 + 2xy) - (x^2 + y^2 + 2xy)$
$= x^2 + y^2 + 2xy - x^2 - y^2 - 2xy = 0$

4. $(x^2 + y^2 + 2xy) + x^2 + y^2 - 2xy$
$= x^2 + y^2 + 2xy + x^2 + y^2 - 2xy$
$= 2x^2 + 2y^2$

5. $-(4x^2 + 3y^2) - (8y^2 - 18x^2)$
$= -4x^2 + 3y^2 - 8y^2 + 18x^2$
$= 14x^2 - 5y^2$

6. $31 - 4b - [3a - 2b - \{a - b(a - 2b)\}]$
$= 31 - 4b - [3a - 2b - \{a - b - a + 2b)\}]$
$= 31 - 4b - [3a - 2b - a + b + a - 2b]$
$= 31 - 4b - [3a - 3b]$
$= 31 - 4b - 3a + 3b$
$= 31 - b - 3a$
$= -3a - b + 31$

7. $(2x^2 - 3) - (5 - 4x^2) + (-6x^2)$
$= 2x^2 - 3 - 5 + 4x^2 - 6x^2$
$= -8$

8. $(x + y + z) - (x + y + z)$
$= x + y + z - x - y - z = 0$

9. $96 + [20x - 8(7x - 10) - 2\{11x - 6(2 - 4x)\}]$

$= 96 + [20x - 56x + 80 - 2\{11x - 12 + 24x\}]$
$= 96 + [-36x + 80) - 2\{35x - 12\}]$
$= 96 + [-36x + 80 - 70x + 24\}]$
$= 96 - 106x + 104$
$= -106x + 200$

10. $3m + [8n - \{m - (8n - 2m)\}]$
$= 3m + [8n - \{m - 8n + 2m\}]$
$= 3m + [8n - \{3m - 8n\}]$
$= 3m + [8n - 3m + 8n]$
$= 3m + 16n - 3m$
$= 16n$

11. $xy - [zy - xz - \{xy - (4y - zx) - (xy - zy)\}]$
$= xy - [zy - xz - \{xy - 4y + zx - xy + zy\}]$
$= xy - [zy - xz + 4y - zx - zy]$
$= xy - [4y - 2xz]$
$= xy - 4y + 2xz$

12. $2p - 3q - [3p - 2q - \{p - q(p + q)\}]$
$= 2p - 3q - [3p - 2q - \{p - q - p - q\}]$
$= 2p - 3q - [3p - 2q - \{-2q\}]$
$= 2p - 3q - [3p - 2q + 2q]$
$= 2p - 3q - 3p = -p - 3q$

13. $m - [4n - \{4m - (3n - 2m + 6n)\}]$
$= m - [4n - \{4m - 3n + 2m - 6n\}]$
$= m - [4n - \{6m - 9n\}]$
$= m - [4n - 6m + 9n]$
$= m - [13n - 6m]$
$= m - 13n + 6m$
$= 7m - 13n$

14. $5x - [x^2 - \{2x(1 - x + 4x^2) - 3x(x^2 - 5x - 3)\}] - 8x$
$= 5x - [x^2 - \{2x(1 - x + 4x^2) - 3x^3 + 15x^2 + 9x\}] - 8x$
$= 5x - [x^2 - \{2x - 2x^2 + 8x^3 - 3x^3 + 15x^2 + 9x\}] - 8x$
$= 5x - [x^2 - \{11x + 13x^2) + 5x^3\}] - 8x$
$= 5x - [x^2 - 11x - 13x^2 - 5x^3] - 8x$

$= 5x - [-12x^2 - 11x - 5x^3] - 8x$
$= 5x + 12x^2 + 11x + 5x^3 - 8x$
$= 16x + 12x^2 + 5x^3 - 8x$
$= 5x^3 + 12x^2 + 8x$

15. $2x - [3y - \{2x - (y - x)\}]$
$= 2x - [3y - \{2x - y + x\}]$
$= 2x - [3y - 2x + y - x\}]$
$= 2x - [4y - 3x]$
$= 2x - 4y + 3x$
$= 5x - 4y$

Liner Equation

Exercise - 9.1

1. (a) $4x = 72$ (b) $x - 8 = 25$
   (c) $32 - x = 8$ (b) $x + 9 = 37$
   (e) $\dfrac{3x}{17} = 17$ (f) $19 - 2x = 11$
   (g) $x^2 = 100$ (h) $4x - 3 = 99 - 10$
   $\qquad\qquad\qquad 4x - 3 = 89$
   (i) $5x = x + 4$ (j) $\dfrac{x}{3} = x - 4$

2. (a) $x - 9 = 12$
   Statement = a number decreased by 9 equal 12
   (b) Three times a number equals 18
   (c) When 5 is added to one fifth of number it equals the number.
   (d) Fifteen times a number decreased by 45 equals 15.
   (e) Two third of a number equals 8
   (f) Five times a number decreased by 6 equals 19.

3. (a) $x + 6 = 14$

x	L.H.S	R.H.S
1	7	14
5	11	14
7	13	14
8	14	14

Here, we see the value of $x = 8$, L.H.S = R.H.S. So, answer is 8.

(b) $x - 1 = 15$

x	L.H.S	R.H.S
1	0	15
5	4	15
10	9	15
14	13	15
16	15	15

Here, we see the value of $x = 16$, L.H.S = R.H.S. So, answer is 16.

(c) $x - 7 = 10$

x	L.H.S	R.H.S
5	– 2	10
10	3	10
15	8	10
17	10	10

Here, we see the value of $x = 17$, L.H.S = R.H.S. So, answer is 17.

(d) $2y = 10$

y	L.H.S	R.H.S
1	2	10
2	4	10
3	6	10
4	8	10
5	10	10

Here, we see the value of $y = 5$, L.H.S = R.H.S. So, answer is 5.

(e) to (j) : Do same as above parts.

4. (a) Put $x = 6$ in the given equation
$$\Rightarrow 2 \times 6 - 4 = 8$$
$$\Rightarrow 12 - 4 = 8$$
$$\Rightarrow 8 = 8$$
So, L.H.S = R.HS

(b) Put $x = 2$ in the given equation
$$\Rightarrow 4 + 3 \times 2 = 10$$
$$\Rightarrow 4 + 6 = 10$$
$$\Rightarrow 10 = 10$$
So, L.H.S = R.HS

(c) Put $x = 15$ in the given equation

$$\Rightarrow \frac{x}{3} = 5$$
$$\Rightarrow \frac{15}{3} = 5$$
$$\Rightarrow 5 = 5$$
So, L.H.S = R.HS

(d) Put $y = 1$ in the given equation
$$\Rightarrow 8 - 7y = 1$$
$$\Rightarrow 8 - 7 \times 1 = 1$$
$$\Rightarrow 1 = 1$$
So, L.H.S = R.HS

5. (a) $15x - 45 = 60$

x	L.H.S	R.H.S
1	– 30	60
3	0	60
5	30	60
7	60	60

Here, we see the value of x = 7, L.H.S = R.H.S. So, answer is 7.

(b) $x - 2 = 8$

x	L.H.S	R.H.S
1	– 1	10
2	0	10
4	2	10
8	6	10
10	8	10

Here, we see the value of $x = 10$, L.H.S = R.H.S. So, answer is 10.

(c) to (d) : Do same as above parts.

(e) $5y - 4 = 3y + 4$

y	L.H.S	R.H.S
1	1	7
2	6	10
3	11	13
4	16	16

Here, we see the value of y = 4, L.H.S = R.H.S. So, answer is 4.

(f) to (h) Do same as above parts.

Exercise - 9.2

1. (a) $x + 6 = 12$

$\Rightarrow x = 12 - 6 \qquad \Rightarrow x = 6$

Check: By putting the value of x into the equation $x + 6 = 12$,

$\Rightarrow 6 + 6 = 12 \qquad \Rightarrow 12 = 12$

So, L.H.S = R=H.S

(b) $x - 3 = 5$

$\Rightarrow x = 5 + 3 \qquad \Rightarrow x = 8$

Check: By putting the value of x into the equation $x - 3 = 5$,

$\Rightarrow 8 - 3 = 5 \qquad \Rightarrow 5 = 5$

So, L.H.S = R=H.S

(c) $x - 4 = -8$

$\Rightarrow x = -8 + 4 \qquad \Rightarrow x = -4$

Check: Put $x = -4$ in the given equation :

$\Rightarrow -4 - 4 = -8 \qquad \Rightarrow -8 = -8$

So, L.H.S = R.H.S

(d) $\dfrac{x}{4} + 9 = 11$

$\Rightarrow \dfrac{x}{4} = 11 - 9 \Rightarrow x = 2 \times 4 = 8$

Check: Put $x = 8$ in the given equation :

$\Rightarrow \dfrac{8}{4} + 9 = 11 \qquad \Rightarrow 2 + 9 = 11$

$\Rightarrow 11 = 11 \quad$ So, L.H.S = R=H.S

(e) $\dfrac{x}{6} = 6 \Rightarrow x = 36$

Check : Put $x = 36$ in the given equation :

$\Rightarrow \dfrac{36}{6} = 6 \qquad \Rightarrow 6 = 6$

So, L.H.S = R.HS

(f) $\dfrac{3m}{5} = 15 \qquad \Rightarrow m = \dfrac{15 \times 5}{3} = 25$

Check : Put $m = 25$ in the given equation :

$\Rightarrow \dfrac{3 \times 25}{5} = 15 \Rightarrow 15 = 15$

So, L.H.S = R.HS

(g) $5p - 3 = p + 17$

$\Rightarrow 5p - p = 17 + 3$

$\Rightarrow 4p = 20 \qquad \Rightarrow p = 5$

Check : Put $x = 5$ in the given equation :

$5 \times 5 - 3 = 5 + 17$

$\Rightarrow 25 - 3 = 22$

$\Rightarrow 22 = 22$

So, L.H.S = R.HS

(h) $11y - 6 = 27$

$\Rightarrow 11y = 27 + 6 \qquad \Rightarrow y = \dfrac{33}{11} = 3$

Check : Put $y = 3$ in the given equation :

$11 \times 3 - 6 = 27$

$\Rightarrow 33 - 6 = 27 \qquad \Rightarrow 27 = 27$

So, L.H.S = R.HS

(i) $4x + 9 = 18 + x$

$\Rightarrow 4x - x = 18 - 9$

$\Rightarrow x = \dfrac{9}{3} = 3$

Check : Put $x = 3$ in the given equation :

$4 \times 3 + 9 = 18 + 3$

$\Rightarrow 12 + 9 = 21 \qquad \Rightarrow 21 = 21$

So, L.H.S = R.HS

(j) $65 + 5x = 3x + 17$

$\Rightarrow 5x - 3x = 17 - 65$

$\Rightarrow 2x = -48 \qquad \Rightarrow x = -24$

Check : Put $x = -24$ in the given equation :

$65 + 5(-24) = 3(-24) + 17$

$\Rightarrow 65 - 120 = -72 + 17$

$\Rightarrow -55 = -55$

So, L.H.S = R.HS

(k) $-7y = 49$

$\Rightarrow y = -7$

Check : Put $y = -7$ in the given equation :

$-7 \times (-7) = 49$

$\Rightarrow 49 = 49$

So, L.H.S = R.HS

(l) $18n = 144$

$n = \dfrac{144}{18}$

$\Rightarrow n = 8$

Check : Put $n = 8$ in the given equation :

$18 \times 8 = 144$

$\Rightarrow 144 = 144$

So, L.H.S = R.HS

(m) $25a = 625$

$a = \dfrac{625}{25}$

$\Rightarrow a = 25$

Check : Put $a = 25$ in the given equation :

$25 \times 25 = 625$

$\Rightarrow 625 = 625$

So, L.H.S = R.HS

(n) $-36 = -9t$

$\Rightarrow t = \dfrac{36}{9}$

Check : Put $t = 4$ in the given equation :

$-36 = -9 \times 4$

$\Rightarrow -36 = -9 \times 4$

$\Rightarrow -36 = -36$

So, L.H.S = R.HS

(o) $\dfrac{m}{12} = \dfrac{9}{36}$

$\Rightarrow m = \dfrac{9 \times 12}{36} \qquad \Rightarrow m = 3$

Check : Put $m = 3$ in the given equation :

$\dfrac{3}{12} = \dfrac{9}{36}$

$\Rightarrow \dfrac{1}{4} = \dfrac{1}{4}$

So, L.H.S = R.HS

2. (a) $\dfrac{7x+3}{9} + 54$

$7x + 3 = 54 \times 9$

$7x = 486 - 3$

$x = \dfrac{483}{7} \qquad x = 69$

Verification : Put $x = 69$ in given equation :

$\dfrac{7 + 69 + 3}{9} = 54$

$= \dfrac{483 + 3}{9} = 54 \qquad \Rightarrow 54 = 54$

L.H.S = R.H.S

(b) $\dfrac{p}{4} - 6 = \dfrac{p}{7} + \dfrac{1}{2}$

$= \dfrac{p}{4} - \dfrac{p}{7} = \dfrac{1}{2} + 6$

$= \dfrac{7p - 4p}{28} = \dfrac{1 + 12}{2}$

$= \dfrac{3p}{28} = \dfrac{13}{2} \qquad = 6p = 28 \times 13$

$p = \dfrac{28 \times 13}{6} = p = \dfrac{182}{3}$

Verification : Put $p = \dfrac{182}{3}$ in the given equation :

$= \dfrac{182}{3 \times 4} - 6 = \dfrac{182}{3 \times 7} + \dfrac{1}{2}$

$= \dfrac{182 - 72}{12} = \dfrac{364 + 21}{42}$

$= \dfrac{110}{12} = \dfrac{385}{42} \qquad = \dfrac{55}{6} = \dfrac{55}{6}$

So, L.H.S = R.H.S

(c) $\dfrac{n}{2} = \dfrac{n}{3} + 1$

$= \dfrac{n}{2} - \dfrac{n}{3} = 1$

$= \dfrac{n}{6} = 1 \qquad n = 6$

Verification : Put $n = 6$ in the given equation :

$= \dfrac{6}{2} = \dfrac{6}{3} + 1$

$= 3 = 2 + 1 \qquad = 3 = 3$

So, L.H.S = R.H.S

(d) $\dfrac{2t}{5} = \dfrac{t-32}{5} - 2$

$= \dfrac{2t}{5} = \dfrac{t-32-10}{5}$

$2t = t - 42$

$2t - t = -42 \qquad t = -42$

Verification : Put $t = -42$ in the given equation :

$= \dfrac{2 \times (-42)}{5} = \dfrac{-42-32}{5} - 2$

$= \dfrac{-84}{5} = \dfrac{-74-10}{5}$

$= \dfrac{-84}{5} = \dfrac{-84}{5}$

So, L.H.S = R.H.S

(e) $15x - 3 = 3(4x + 1)$

$= 15x - 3 = 12x + 3$

$= 15x - 12x = 3 + 3$

$= 3x = 6$

$= x = \dfrac{6}{3} \qquad = x = 2$

Verification : Put $x = 2$ in the given equation :

$15 \times 2 - 3 = 3(4 \times 2 + 1)$

$= 30 - 3 = 3(8 + 1)$

$= 27 = 3 \times 9$

$= 27 = 27$

So, L.H.S = R.H.S

(f) $\dfrac{x}{9} - 2 = 5$

$= \dfrac{x-18}{9} = 5$

$= x - 18 = 45$

$= x = 45 + 18$

$= x = 63$

Verification : Put $x = 63$ in the given equation :

$= \dfrac{63}{9} - 2 = 5 \qquad = \dfrac{21}{3} - 2 = 5$

$= 7 - 2 = 5 \qquad 5 = 5$

So, L.H.S = R.H.S

(g) $10(5-x) = 5(x-4)$

$= 50 - 10x = 5x - 20$

$= -10x - 5x = -20 - 50$

$= -15x = -70$

$= x = \dfrac{70}{15} \qquad x = \dfrac{14}{3}$

Verification : Put $x = \dfrac{14}{3}$ in the given equation.

$= 10\left(5 - \dfrac{14}{3}\right) = 5\left(\dfrac{14}{3} - 4\right)$

$= 10 \times \dfrac{1}{3} = 5 \times \dfrac{2}{3}$

$\dfrac{10}{3} = \dfrac{10}{3}$

So, L.H.S = R.H.S

(h) $\dfrac{3}{2}x + \dfrac{1}{4} = x - 2$

$= \dfrac{2 \times 3x + 1}{4} = x - 2$

$= 6x + 1 = 4x - 8$

$= 6x - 4x = -8 - 1$

$= 2x = -9$

$x = \dfrac{-9}{2}$

Verification : Put $x = \dfrac{-9}{2}$ in the given equation :

$\dfrac{3}{2} \times \left(\dfrac{-9}{2}\right) + \dfrac{1}{4} = \dfrac{-9}{2} - 2$

$= \dfrac{-27+1}{4} = \dfrac{-9-4}{2}$

$= \dfrac{-26}{4} = \dfrac{-13}{2}$

$= \dfrac{-13}{2} = \dfrac{-13}{2}$

So, L.H.S = R.H.S

Exercise - 9.3

1. Let the required number $= x$

$\Rightarrow 6x - x = 95$

$\Rightarrow 5x = 95 \qquad \Rightarrow x = 19$

2. Let the consecutive numbers are $(x+1), (x+2)$ and $(x+3)$

$\Rightarrow x + 1 + x + 2 + x + 3 = 99$

$\Rightarrow 3x + 6 = 99 \qquad \Rightarrow 3x = 99 - 6$

$\Rightarrow x = \dfrac{93}{3} = 31$

The required number are :-

$x + 1 = 31 + 1 = 32$

$x + 2 = 31 + 2 = 33$

$x + 3 = 31 + 3 = 34$

3. Let the number $= x$

$\Rightarrow 2x + 5 = 45$

$\Rightarrow 2x = 45 - 5 \qquad \Rightarrow x = \dfrac{40}{2} = 20$

$x = 20$

So, the number is 20.

4. Let one of them $= x$

Then the other number $= x + 15$

So, $x + x + 15 = 75$

$\Rightarrow 2x = 75 - 15 \quad \Rightarrow x = \dfrac{60}{2}$

$\Rightarrow x = 30$

So, the number are 30 and (30 + 15 = 45).

5. Let the one number $= x$, then the other number $= 4x$

$\Rightarrow 4x - x = 90$

$\Rightarrow 3x = 90 \qquad \Rightarrow x = \dfrac{90}{3} = 30$

$\Rightarrow x = 30$

So, the number are 30 and $30 \times 4 = 120$.

6. Let the breadth $= x$

Then length $= 3x$

Area $= x \times 3x = 48 m^2$

$\Rightarrow 3x^2 = 48 \qquad \Rightarrow x^2 = \dfrac{48}{3}$

$x^2 = 16 \; x = \sqrt{16} \; = x = 4$

So, the dimensions are breadth $= x = 4m$ and length $= 3x = 3 \times 4 = 12m$.

7. Let the length $= x$

Then breadth $= x - 8$

Perimeter $= 2(l + b) = 72$

$\Rightarrow 2(x + x - 8) = 72$

$\Rightarrow 2(2x - 8) = 72$

$\Rightarrow 4x - 16 = 72$

$\Rightarrow 4x = 72 + 16$

$x = \dfrac{88}{4} = 22$

So, Length $= x = 22m$

and Breadth $= 22 - 8 = 14m$

8. Let the age of his sister $= x$ years

Then the age of Umesh $= (x - 5)$ years

So, $x + x - 5 = 45$

$= 2x - 5 = 45$

$= 2x = 45 + 5 \qquad = x = \dfrac{50}{2} = 25$

$x = 25$

So, the age of Umesh $= 25 - 5 = 20$ years and the age of his sister $= x = 25$ years.

9. Let the age of Manu $= x$ years

Then Anu's age $= 2x$ years

$2x - x = 2 \qquad = x = 2$

So, the age of Manu after 10 years

$= x + 10$

$= 2 + 10 = 12$ years

and the age of Anu after 10 years

$= 2x + 10$

$= 2 \times 2 + 10 = 14$ years

10. Let the age of Nidhi $= x$ years

Then the age of Mr. Saxena $= (x + 25)$ years

After 5 years

$x + 25 + 5 = 2(x + 5)$

$\Rightarrow x + 30 = 2x + 10$

$\Rightarrow x = 20$

So, the present age of Nidhi $= x = 20$ years

and present age of Mr. Sexena $= x + 25 = 20 + 25 = 45$ years.

11. Let the age of the son $= x$ years

Then the age of the man $= 4x$ years

After 16 years

$4x + 16 = 2(x + 16)$

$\Rightarrow 4x - 2x = 32 - 16 \qquad x = \dfrac{16}{2} = 8$

So, the present age of the son = 8 years and present age of the man = $4 \times 8 = 32$ years.

12. Let the number of 50 p coins = x
Then the number of 25 p coins = $6x$
$50 \times x + 25 \times 6x = 50 \times 100$
$\Rightarrow 50x + 150x = 500$
$\Rightarrow x = \dfrac{5000}{200}$ $\Rightarrow x = 25$

13. Let the age of his son = x years
Then the age of Rahim = $4x$ years
After 10 years
$4x + 10 = 2(x + 10)$
$\Rightarrow 4x + 10 = 2x + 20$
$\Rightarrow 2x = 10$ $\Rightarrow x = 5$
So, the age of Rahim = $4 \times 5 = 20$ years.

14. Let the present age of Navin = x years
8 years ago the age of Navin = $(x - 8)$ years
After 32 years
$x + 32 = 3(x - 8)$
$\Rightarrow x + 32 = 3x - 24$
$\Rightarrow 2x = 56$ $\Rightarrow x = 28$
So, the present age of Navin = 28 years.

15. Let the two consecutive even numbers = $2x, 2x + 2$
Then $2x + 2x + 2 = 42$
$\Rightarrow 4x = 40$
$\Rightarrow x = 10$
Thus the required numbers are $10 \times 2 = 20$ and $(10 \times 2 + 2) = 22$

16. Let the three consecutive odd number are $(2x + 1)$, $(2x + 3)$ and $(2x + 5)$
Then $2x + 1 + 2x + 3 + 2x + 5 = 27$
$\Rightarrow 6x = 27 - 9$

$\Rightarrow x = \dfrac{18}{6} = 3$
Thus the required number are 7, 9 and 11.

17. Let the present age of Karim = x years
After 10 years the age of Karim = $(10 + x)$ years
Then $x + 10 = 3x$
$\Rightarrow 2x = 10$
$\Rightarrow x = 5$
Thus the present age of Karim = 5

Ratio and Proportion
Exercise 10

1. (a) $30 : 45$
$= \dfrac{30}{45} = \dfrac{6}{9} = \dfrac{2}{3} = 2 : 3$

(b) $23 : 46$
$= \dfrac{23}{46} = \dfrac{1}{2} = 1 : 2$

(c) $15 : 35$
$= \dfrac{15}{35} = \dfrac{3}{7} = 3 : 7$

(d) 45 paise to ₹ 4
$= \dfrac{45}{400} = \dfrac{9}{80} = 9 : 80$

(e) 80 gram to 8 kg
$= \dfrac{80}{8000} = \dfrac{1}{100} = 1 : 100$

(f) 250 kg to 5000 gram
$= \dfrac{250}{5} = \dfrac{50}{1} = 50 : 1$

(g) $1\dfrac{1}{2}$ hrs to 5 hrs
$= \dfrac{3}{2} : 5$
$= \dfrac{3}{2 \times 5} = \dfrac{3}{10} = 3 : 10$

(h) $12 : 20$
$= \dfrac{12}{20} = \dfrac{3}{5} = 3 : 5$

(i) 32 minutes to 360 minutes

$$= \frac{32}{360} = \frac{8}{90} = \frac{4}{45} = 4:45$$

(j) 1 hour to 45 seconds

$$= \frac{60 \times 60}{45} = \frac{4 \times 60}{3} = \frac{80}{1} = 80:1$$

(k) 2 metres to 40 decimeters

$$= \frac{20}{40} = \frac{1}{2} = 1:2$$

2. (a) ₹ 5.80 : ₹ 16.80

$$= \frac{5.80}{16.80} = \frac{580}{1680} = \frac{29}{84} = 29:84$$

(b) 4 months : 5 years

$$= 4:60$$

$$= \frac{4}{60} = \frac{1}{15} = 1:15$$

(c) 4m 6cm : 40cm

$$= \frac{406}{40} = \frac{203}{20} = 203:20$$

(d) 1kg 500g : 5kg 100g

$$= 1500:5100$$

$$= \frac{1500}{5100} = \frac{15}{51} = 15:51 = 5:17$$

(e) 48 min : 2 hrs 35 min

$$= 48:155 = \frac{48}{155}$$

3. (a) 4 : 28

$$= \frac{4}{28} = \frac{1}{7} = 1:7$$

(b) 1 : 10   (c) $\frac{3}{4} = 3:4$

(d) 2 : 1   (e) 3 : 4

4. (a) Time taken by Rahim from Delhi to Ghaziabad is 3/2 time that of Ram.

(b) The number of villages in India is 20/3 time that of cities.

(c) The number of good bats product in a factory is 5/2 times that of bad bats.

5. (a) 3 : 5 or 16 : 20

3 : 5 or 4 : 5

So, the larger ratio is 4 : 5

(b) 5 : 12 or 17 : 30

Writing the given ratios as fractions,

$$5:12 = \frac{5}{12} \quad \text{and} \quad 17:30 = \frac{17}{30}$$

L.C.M of 12 and 30 = 3 × 2 × 2 × 5

=60

Making the denominator of each fraction equal to 60,

$$= \frac{5}{12} = \frac{25}{60} \text{ and } \frac{17}{30} = \frac{34}{60}$$

We see that 34 > 25

Therefore, $\frac{34}{60} > \frac{25}{60} \Rightarrow \frac{17}{30} > \frac{5}{12}$

or (17 : 30) > (5 : 12)

(c) 4 : 3 or 4 : 9

Writing the given ratio as fractions,

$$4:3 = \frac{4}{3} \quad \text{and} \quad 4:9 = \frac{4}{9}$$

Here numerators are same so fraction which has less denominator is larger.

$$\frac{4}{3} > \frac{4}{9} \quad \text{or} \quad (4:3) > (4:9)$$

(d) 1 : 4 or 12 : 15

Writing the given ratio as fractions,

$$1:4 = \frac{1}{4} \quad \text{and} \quad 12:15 = \frac{12}{15} = \frac{4}{5}$$

L.C.M of 4 and 5 = 20

Making the denominator of each fraction equal to 20,

$$\frac{1}{4} = \frac{5}{4 \times 5} = \frac{5}{20} \text{ and } \frac{4}{5} = \frac{4 \times 4}{5 \times 5} = \frac{16}{20}$$

We see that 16 > 5

Therefore, $\frac{16}{20} > \frac{5}{20} \Rightarrow \frac{1}{4} < \frac{4}{5}$

or (12 : 15) > (1 : 4)

6. (a) The required ratio $= \dfrac{\text{Income}}{\text{Expenditure}}$

$$= \frac{2,50,000}{50,000} = \frac{5}{1} = 5:1$$

(b) The required ratio $= \dfrac{\text{Expenditure}}{\text{Income}}$

$$= \frac{50,000}{2,50,000} = \frac{1}{5} = 1:5$$

7. (a) The ratio of Avneesh's earning

to his wife $= \dfrac{\text{Avneesh's earning}}{\text{Wife's earning}}$

$= \dfrac{45000}{65000}$

$= \dfrac{45}{65} = \dfrac{9}{13} = 9 : 13$

(b) The required

ratio $= \dfrac{\text{Avneesh's earning}}{\text{Total earning}}$

$= \dfrac{45000}{45000 + 65000} = \dfrac{45000}{110000}$

$= \dfrac{45}{110} = \dfrac{9}{22} = 9 : 22$

(c) The required

ratio $= \dfrac{\text{Wife's earning}}{\text{Avneesh's earning}}$

$= \dfrac{65,000}{45,000} = \dfrac{13}{9} = 13 : 9$

(d) The required

ratio $= \dfrac{\text{Avneesh's wife's earning}}{\text{Difference of their earning}}$

$= \dfrac{65000}{65000 - 45000} = \dfrac{65000}{20000}$

$= \dfrac{13}{4} = 13 : 4$

8. (a) Required ratio $= \dfrac{\text{Hillary earning}}{\text{Hillary's saving}}$

$= \dfrac{11,500}{15,00} = \dfrac{115}{15} = \dfrac{23}{3} = 23 : 5$

(b) Required ratio $= \dfrac{\text{Saving}}{\text{Expenditure}}$

$= \dfrac{1500}{11500 - 1500} = \dfrac{1500}{10000}$

$= \dfrac{15}{100} = \dfrac{3}{20} = 3 : 20$

(c) Required ratio $= \dfrac{\text{Earning}}{\text{Expenditure}}$

$= \dfrac{11500}{10000} = \dfrac{115}{100}$

$= \dfrac{23}{20} = 23 : 20$

(d) Required ratio $= \dfrac{\text{Saving}}{\text{Earning}}$

$= \dfrac{1500}{11,500} = \dfrac{15}{115}$

$= \dfrac{3}{23} = 3 : 23$

9. (a) Required ratio $= \dfrac{\text{Men}}{\text{Women}}$

$= \dfrac{80}{200 - 80} = \dfrac{80}{120}$

$= \dfrac{8}{12} = \dfrac{2}{3} = 2 : 3$

(b) Required ratio $= \dfrac{\text{Women}}{\text{Total persons}}$

$= \dfrac{120}{200} = \dfrac{12}{20} = \dfrac{3}{5} = 3 : 5$

(c) Required ratio $= \dfrac{\text{Men}}{\text{Total persons}}$

$= \dfrac{80}{200} = \dfrac{8}{20} = \dfrac{2}{5} = 2 : 5$

(d) Required ratio $= \dfrac{\text{Women}}{\text{Men}}$

$= \dfrac{120}{80} = \dfrac{12}{8} = \dfrac{3}{2} = 3 : 2$

10. The ratio of their

speed $= \dfrac{\text{Speed of cycle}}{\text{Speed of car}}$

$= \dfrac{45}{5} \div \dfrac{120}{6}$

$= \dfrac{45 \times 6}{5 \times 120} = \dfrac{9}{20} = 9 : 20$

11. Boy and girls ratio $= 5 : 4$

Girls $= 80$

Then boys $= \dfrac{5}{4} \times 80$

The number of boys $= 100$

Total students $= 100 + 80 = 180$

12. $p : q : r = 6 : 9 : 10$

$6 + 9 + 10 = 25$

$p = \dfrac{6}{25} = 625 = ₹150$

$q = \dfrac{9}{25} = 625 = ₹225$

$r = \dfrac{10}{25} = 625 = ₹250$

13. The required ratio

$$= \frac{\text{Countries electrified in Asia}}{\text{Countries electrified in Europe}}$$

$$= \frac{200}{700} = \frac{2}{7} = 2 : 7$$

14. First part $= 3x$

Second part $= 4x$

Then $3x + 4x = 119$

$$x = \frac{119}{7} = 17$$

So, first part $= 3 \times 17 = 51$

and second part $= 4 \times 17 = 68$

15. Defective bolt $= \frac{2}{15} \times 435 = 58$

16. Saving $= \frac{4}{11} \times$ Expenditure

$$= \frac{4}{11} \times 2200 = ₹ \, 800$$

17. Required ratio $= \frac{\text{Price of math book}}{\text{Price of english book}}$

$$= \frac{240}{12} \Big/ \frac{135}{15} = \frac{240 \times 15}{12 \times 135} = \frac{20}{9} = 20 : 9$$

18. Let length $= 5x$

and breadth $= 3x$

Perimeter $= 2$ (length + breadth)

$48 = 2 \times 8x$

$\Rightarrow x = 3$

So, the length $= 5 \times 3 = 15$

and the breadth $= 3 \times 3 = 9$

Exercise - 10.2

1. (a) $\frac{8}{20} = \frac{40}{100}$

$= \frac{2}{5} = \frac{2}{5} = $ True

(b) True (c) True (d) True (e) True
(f) False (g) True

2. (a) $2 : 4 :: 13 : 26$

$\frac{2}{4} = \frac{1}{2}$, $\frac{13}{26} = \frac{1}{2}$

Yes they are in proportion.

(b) We have, $22 : 33 = \frac{22}{33} = \frac{2}{3}$ and,

$2 : 3 = \frac{2}{3}$

$\because 22 : 33 = 2 : 3$

So, $22 : 33 :: 2 : 3$

Thus 22, 33, 2 and 3 are in proportion.

(c) We have, $150 : 200 = \frac{150}{200} = \frac{3}{4}$

and , $250 : 300 = \frac{250}{300} = \frac{5}{6}$

$\because 150 : 200 \neq 250 : 300$

So, 150, 200, 250 and 300 are not in proportion.

(d) We have, $100 : 150 = \frac{100}{150} = \frac{2}{3}$

and , $200 : 300 = \frac{200}{300} = \frac{2}{3}$

$\because 100 : 150 = 200 : 300$

So, $100 : 150 :: 200 : 300$

Thus, 100, 150, 200 and 300 are in proportion.

(e) We have, $55 : 65 = \frac{55}{65} = \frac{13}{11}$

and , $65 : 55 = \frac{65}{55} = \frac{11}{13}$

$\therefore 55 : 65 \neq 65 : 55$

So, the are not proportion.

(f) We have, $3 : 4 = \frac{3}{4}$ and $5 : 6 = \frac{5}{6}$

$\therefore 3 : 4 \neq 5 : 6$

So, they are not in proportion.

(g) We have, $8 : 16 = \frac{8}{16} = \frac{1}{2}$

and , $4 : 8 = \frac{4}{8} = \frac{1}{2}$

$\therefore 8 : 16 = 4 : 8$

So, $8 : 16 :: 4 : 8$

So, they are in proportion.

(h) We have, $2 : 8 = \frac{2}{8} = \frac{1}{4}$

and , $9 : 36 = \frac{9}{36} = \frac{1}{4}$

$\because 2 : 8 = 9 : 36$

Thus, 2, 8, 9 and 36 are in proportion.

3. (a) $80 : 20 = 160 : 40$

$\frac{80}{20} = \frac{160}{40}$

4 = 4   L.H.S = R.H.S

(b) $2 : 3 = 6 : 9$

$\dfrac{2}{3} = \dfrac{6}{9} = \dfrac{2}{3}$

$\dfrac{2}{3} = \dfrac{2}{3}$ L.H.S = R.H.S

(c) $108 : 72 = 129 : 86$

L.H.S $= \dfrac{108}{72} = \dfrac{27}{18} = \dfrac{9}{6} = \dfrac{3}{2}$

R.H.S $= \dfrac{129}{86} = \dfrac{3}{2}$ L.H.S = R.H.S

(d) $42 : 7 = 36 : 6$

$\Rightarrow \dfrac{42}{7} = \dfrac{36}{6}$

$\Rightarrow \dfrac{6}{1} = \dfrac{6}{1}$ L.H.S = R.H.S

(e) $55 : 50 = 121 : 110$

$\Rightarrow \dfrac{55}{50} = \dfrac{121}{110}$

$\Rightarrow \dfrac{11}{10} = \dfrac{11}{10}$ L.H.S = R.H.S

(f) $10 : 12 = 5 : 6$

$\Rightarrow \dfrac{10}{12} = \dfrac{5}{6}$

$\Rightarrow \dfrac{5}{6} = \dfrac{5}{6}$ L.H.S = R.H.S

4. (a) Value of x.

$55 : 11 = x : 6$

$\Rightarrow 11 \times x = 55 \times 6$

$\Rightarrow x = \dfrac{55 \times 6}{11}$ $\Rightarrow x = 30$

(b) $25 : 5 = x : 4$

$\Rightarrow 5 \times x = 25 \times 4$

$\Rightarrow x = \dfrac{25 \times 4}{5}$ $\Rightarrow x = 20$

(c) $206 : 103 = x : 22$

$\Rightarrow 103 \times x = 206 \times 22$

$\Rightarrow x = \dfrac{206 \times 22}{103}$ $\Rightarrow x = 44$

(d) $x : 92 = 87 : 116$

$\Rightarrow x \times 116 = 92 \times 87$

$\Rightarrow x = \dfrac{92 \times 87}{116}$ $\Rightarrow x = \dfrac{23 \times 87}{29}$

$\Rightarrow x = 69$

(e) $117 : 13 = 81 : x$

$\Rightarrow 117 \times x = 13 \times 81$

$\Rightarrow x = \dfrac{13 \times 81}{117}$ $\Rightarrow x = 9$

(f) $1000 : x = 500 : 5$

$\Rightarrow 500 \times x = 1000 \times 5$

$\Rightarrow x = \dfrac{1000 \times 5}{500}$ $\Rightarrow x = 10$

5. Let the fourth term $= x$

then, $8 : 16 = 50 : x$

$\Rightarrow 8 \times x = 16 \times 50$

$\Rightarrow x = \dfrac{16 \times 50}{8}$ $\Rightarrow x = 100$

6. Let the third term $= x$

then, $15 : 10 : : x : 20$

$\Rightarrow 10 \times x = 15 \times 20$

$\Rightarrow x = \dfrac{15 \times 20}{10}$ $\Rightarrow x = 30$

7. Let the second term = x

then, $45 : x : : 25 : 35$

$\Rightarrow x \times 25 = 45 \times 35$

$\Rightarrow x = \dfrac{45 \times 35}{25}$ $\Rightarrow x = 63$

8. (a) We have, $25 : 10 = \dfrac{25}{10} = \dfrac{5}{2}$

and , $10 : 4 = \dfrac{10}{4} = \dfrac{5}{2}$

$\because 25 : 10 = 10 : 4$

So, $25 : 10 : : 10 : 4$

Thus, 25, 10 and 4 are in proportion.

(b) We have, $16 : 84 = \dfrac{16}{84} = \dfrac{4}{21}$

and , $84 : 441 = \dfrac{84}{441} = \dfrac{4}{21}$

$\because 16 : 84 = 84 : 441$

So, $16 : 84 : : 84 : 441$

Thus, 14, 84, and 441 are in proportion.

9. (a) $49 : x : : x : 64$

$x \times x = 49 \times 64$

$x^2 = 49 \times 64$

$x = \sqrt{49 \times 64}$

50

$x = 7 \times 8$

Mean proportion $x = 56$

(b) $144 : x :: x : 169$

$x \times x = 144 \times 169$

$x^2 = 144 \times 169$

$x = \sqrt{144 \times 169}$

$x = 12 \times 13$

$x = 156$

(c) $225 : x :: x : 256$

$x \times x = 225 \times 256$

$x^2 = 225 \times 256$

$x = \sqrt{225 \times 256}$

$x = 15 \times 16$

$x = 240$

(d) $1225 : x :: x : 900$

$x \times x = 1225 \times 900$

$x^2 = 1225 \times 900$

$x = \sqrt{1225 \times 900}$

$x = \sqrt{35 \times 35 \times 30 \times 30}$

$x = 35 \times 30$

$x = 1050$

10. (a) We have $18 \times 38 = 36 \times 19 \ldots$ (a)

Thus, Ist term = 18 and fourth term = 38

IInd term = 36 and third term = 19

$\therefore 18 : 36 :: 19 : 38$

We can write (a) as $36 \times 19 = 18 \times 38$

$\therefore 36 : 18 :: 38 : 19$

Hence, the required proportion are

$18 : 36 :: 19 : 38$

$36 : 18 :: 38 : 19$

$18 : 19 :: 36 : 38$

$19 : 18 :: 38 : 36$

(b) We have $15 \times 900 = 60 \times 225$ .... (a)

Thus, Ist term = 15 and fourth term = 900

IInd term = 60 and third term = 225

$\therefore 15 : 60 :: 225 : 900$

We can write (a) as $15 \times 900 = 225 \times 60$

$\therefore 15 : 225 :: 60 : 900$

Now clearly, two more proportions are :

$60 : 15 :: 900 : 225$

and $225 : 15 :: 900 : 60$

Hence, the required proportion are

$15 : 60 :: 225 : 900$

$15 : 225 :: 60 : 900$

$60 : 15 :: 900 : 225$

$225 : 15 :: 900 : 60$

(c) We have $27 \times 162 = 81 \times 54$ .... (a)

Thus, Ist term = 27 and fourth term = 162

IInd term = 81 and third term = 54

$\therefore 27 : 81 :: 54 : 162$

We can write (a) as $27 \times 162 = 54 \times 81$

$\therefore 27 : 54 :: 81 : 162$

Now clearly, two more proportions are :

$81 : 27 :: 162 : 54$

and $54 : 27 :: 162 : 81$

Hence, the required proportion are

$27 : 81 :: 54 : 162$

$81 : 27 :: 162 : 54$

$27 : 54 :: 81 : 162$

$54 : 27 :: 162 : 81$

(d) Do same as above part.

11. $121 : x :: x : 289$

$x \times x = 121 \times 289$

$x^2 = 121 \times 289$

$x = \sqrt{121 \times 289}$

$x = 11 \times 17$

$x = 187$

12. $42 : 84 : 84 : x$

$42 \times x = 84 \times 84$

$x = \dfrac{84 \times 84}{42}$ $x = 168$

13. $72 : 144 :: 144 : x$

$72 \times x = 144 \times 144$

$$x = \frac{144 \times 144}{72} \quad x = 288$$

14. $a : x :: x : c$

$a \times c = x \times x$

$x \times x = a \times c$

$x^2 = ac$

$x = \sqrt{ac}$

Basic Concepts of Geometry
Exercise - 11

1. (a) The names of the lines are M, N, O

(b) Lines in the given figure are :-
DA, AB, AC, BC, CD

2. (a) Edge of ruler and Meeting place of two walls are example of lines.

(b) Surface of table and surface of Carrom board are examples of planes.

3. Yes, we draw unlimited lines through P.

4. Only one line $\overline{x \qquad y}$ can be drawn through two points.

5. (a) plane (b) line (c) curve (d) line

6. (a) Unlimited points

(b) Infinite lines can be drawn

(c) Only one line can be drawn

7. **Concurrent line**→ When three or more lines pass through a point in a plane it called concurrent lines.
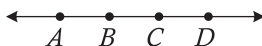
8. **Collinear points** → When three or more points lie on same line in a plane then these are called collinear points. Only one line can be drawn passing through four collinear points.

9. (a) cd, ac, ch, bc (b) f, a, b, g

(c) e, f, g (d) ad, fg, ac

(e) fg, ac, ad and eh, ac, bc

10. Here A, B, C and D are collinear in the figure.

11. (a) lm, mn, ln

(b) p, q, r, s, t, u, v

(c) x, y

(d) p, q, s, u and p, r, t, v
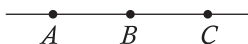
(e) x, m

Line Segments and Rays
Exercise - 12

1. (a) All line segments = MN, PQ

(b) OM, ON, NB, MB, MA, NA, OP, OQ, PC, QC, PD, QD

(c) MN and PQ are non-intersecting line segments.

2. Do yourself.

3. AB, AC and BC are three line segments.

4. (a) 6, AB, BC, CD, AD, BD, AC

(b) 6, QO, OM, QM, PR, PN, RN

(c) 12, $ED, DC, EG, CG, AB, BH, HF, AF, BC, HD, FE, AG$

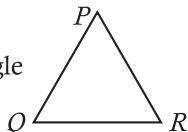**5.** Do yourself.

6. Do yourself.

7. Do yourself.

8. Please measure help of ruler. Do yourself.

Triangles and its Constructions
Exercise - 13

1. No.

2. Triangle

52

3. **Fill in the blanks :**
(a) 3 (b) 3 (c) 3 (d) 6 (e) 180° (f) 180° (g) equal

4. **In triangle *ABC*, write :**
(a) AB (b) BC
(c) AC (d) $\angle A$
(e) $\angle B$ (f) $\angle C$
(g) C (h) B
(i) A

5. **Triangle :** A triangle is a plane figure that is closed by three straight line segments.
Triangular region : The Interior part of triangle together with itself is known as triangular region.

6. Sum of three angles of a triangle = 180°
Third angle $= 180° (75 + 48)$
$= 180° - 123°$
$= 57°$

7. Let the angles are $2x°$, $3x°$ and $5x°$
Then $2x + 3x° + 5x° = 180°$
$10x = 180$ $= x = 18°$
So the angles are 36°, 54° and 90°.

8. Let the acute are $5x°$ and $4x°$
In right angle triangle
$4x° + 5x° + 90 = 180°$
$9x° = 90°$ $= x = 10°$
So the angles are 90°, 40° and 50°.

9. Let the third angle of an isosceles triangle $= x°$
Then each equal angle $= 2x°$
So, $x° + 2x° + 2x° = 180°$
$\Rightarrow 5x° = 180°$
$\Rightarrow x = 36°$
So all the angles are 36°, 72° and 72°.

10. Let the each of two equal angles is $x°$, then

$x° + x° + 20 = $ obtuse angle
So, $x° + x° + x° + x° + 20 = 180°$
$\Rightarrow 4x° = 180° - 20$
$x° = \dfrac{160°}{4} = 40°$
So, all the angles are 40°, 40° and 100°.

11. Given $\angle 1 = \angle 2 + \angle 3$
In a triangles
$\angle 1 + \angle 2 + \angle 3 = 180°$
$\angle 1 + \angle 1 = 180°$
$\angle 1 = 90°$
One angle of a triangle is 90°
So, the triangle is right triangle.

12. Sum of two acute angle in a right triangle = 90°
Other angle $= 90° - 48° = 42°$
So, the other angles are 42° and 90°.

13. Sum of angles $= 180°$
Let the third angle $= x°$
then, $x° + 105° + 35° = 180°$
$\Rightarrow x° = 180° - 140°$
$x = 40°$

14. (a) no (b) yes (c) yes (d) no (e) yes (f) no (g) yes (h) yes

15. $2\angle P = 3\angle Q$ and $6\angle R = 3\angle Q$

$\angle P = \dfrac{2}{3} \angle Q$ $\angle R = \dfrac{1}{2} \angle Q$

$\because$ Sum of the angles of a triangle $= 180°$
$\angle P + \angle Q + \angle R = 180°$
$\Rightarrow \dfrac{3}{2} \angle Q + \angle Q + \dfrac{1}{2} \angle Q = 180°$
$\Rightarrow \dfrac{6}{2} \angle Q = 180°$
$\Rightarrow \angle Q = \dfrac{180°}{3} = 60°$

$\therefore \angle P = \dfrac{3}{2} \times 60 = 90°$

$\angle R = \dfrac{1}{2} \times 60 = 30°$

16. We know that the sum of angles of a triangle $= 180°$

So, in $\triangle ABC$,

$\angle 2 + \angle 3 + \angle 4 = 180°$ (i)

and in $\triangle ADB$,

$\angle 1 + \angle 6 + \angle 5 = 180°$ (ii)

equation (i) + (ii) : $\rightarrow$

$\angle 1 + \angle 2 + \angle 3 + \angle 4 + \angle 5 + \angle 6 =$
$180° + 180° = 360°$

17. There are five triangles in the given figure and we know that triangle has sum of angles is $180°$.

$\angle A + \angle B + \angle C + \angle D + \angle E + \angle F + \angle G = 5 \times 180° = 900°$

18. Do yourself.

19. The angles of an equilateral triangle are equal

So, $3x = 180$

        $x = 60°$

Thus, the measure of each angle of an equilateral triangle is $60°$.

20. $\because AC = BC$

$\therefore \angle A = \angle B = 50°$

and $\angle A + \angle B + \angle C = 180°$

$\angle C = 180° - (50° + 50°)$

$\angle C = 80°$

21. (a) Yes (b) Yes (c) Yes

22. Let the interior opposite angles are $x°$ and $y°$, then

$\because$ Exterior angle = Sum of its interior opposite angles

$120 = y° + x°$ (i)

$20 = y° - x°$ (ii)

$140 = 2y°$

$\Rightarrow y° = 70°$

and $x° = 120 - 70 = 50°$

Third angle of triangle $= 180 - 120$
                            $= 60°$

23. Let the interior opposite angle are $3x°$ and $2x°$

$3x° + 2x° = 110°$

$\Rightarrow 5x = 110°$

$x° = 22°$

Then interior opposite angles are $66°$ and $44°$

Third angle of triangle

$= 180° - 66° + 44°$

$= 180° - 110°$

$= 70°$

24. $\angle CAD + \angle ADC + \angle DCA = 180°$

$\angle CAD + 80° + 90° = 180°$

$\therefore \angle CAD = 180° - 170° = 10°$

(a) $\angle EAC + \angle ACAD + 40° = 180°$
(Linear pair)

$\therefore \angle EAC + 10° + 40° = 180°$

$\Rightarrow \angle EAC = 130°$

(b) $\angle CAD = 10°$

(c) $\angle EAC + \angle C + \angle B =$ (Exterior angle)

$\Rightarrow \angle B = 130° - \angle C$

$= 130° - 90° = 40°$

(d) $\angle ADB = 180° - 80°$ (Linear pair of angles)

$= 100°$

25. (a) $\angle B = 35°$

(b) $35° + 20° + \angle ACD = 180°$

$\angle ADC = 180° - 55° = 125°$

(c) $\angle CEB = \angle BDE + 36°$

$180° - \angle ADC + 35°$

$= 180° - 125° + 35° = 90°$

(d) $\angle CAF = 20° + 125°$ (Exterior angle) $= 145°$

(e) $\angle BDE = 180° - \angle ADC$

$= 180° - 125° = 55°$

26. (a) $\angle BCE = \angle A + \angle ABC$ (Exterior angle)

$= 42° + 180° - 110°$

$= 42° + 70° = 112°$

(b) $\angle ACB + \angle BCE = 180°$ (Linear pair of angles)

$\angle ACB = 180° - 112° = 68°$

(c) $\angle ABC = 180° - \angle DBC$

$= 180° - 110°$

$= 70°$

27. (a) Equilateral triangle
(b) Scalene triangle
(c) Isosceles triangle
(d) Equilateral triangle

28. (a) Equilateral triangle
(b) Isosceles triangle
(c) Scalene triangle

Exercise - 13.2

1. (a) We know that the sum of any two sides of a triangle is always greater than the third side of it.

So, we have $2 + 5 = 7$

$2 + 7 > 5$ and $5 + 7 > 2$

So, this triangle cannot be made.

(b) We know that the sum of any two sides of a triangle is always greater than the third side of it.

So, we have $5 + 8 > 12$

$5 + 12 > 8$

$8 + 12 > 5$

So, triangle can be made

(c) to (g) Do same as above part.

2. No, three collinear points M, N, O Cannot formed a triangle because

a triangle has three sides and three vertices.

3. In triangle ABD :-

$AD + AB > BD$ \quad (i)

and in $\triangle BCD$:-

$CD + AB > BD$ \quad (ii)

Equation (i) + (ii)

$AD + CD + (AB + BC) > 2BD$

$AD + CD + AC > 2BD$ Proved

4. (a) $OP + OR > PR$
(b) $PQ < OP + OQ$
(c) $OR + OQ > QR$
(d) $PR + RQ = PQ$

5. Do yourself

Geometrical Constructions
Exercise - 14

Do yourself

Symmetry
Exercise - 15

1. **Tick (✓) the correct answer :**

(i) (a) No line of symmetry

(ii) (c) a line joining the midpoint of its opposite sides

(iii) (d) four lines of symmetry

(iv) (b) each of its diagonals

(v) (d) An unlimited number of lines of symmetry

(vi) (a) AD

2. (i) True
(ii) True
(iii) True
(iv) False
(v) True
(vi) True
(vii) True

Data Handling
Exercise - 16

1. (a) Restaurants = 28 in Delhi

(b) Chennai   (c) Delhi = 28
(d) Hyderabad = 26 Jaipur = 24
More = 2

2.

3.

4.

(i) Mathematics
(ii) English

5.