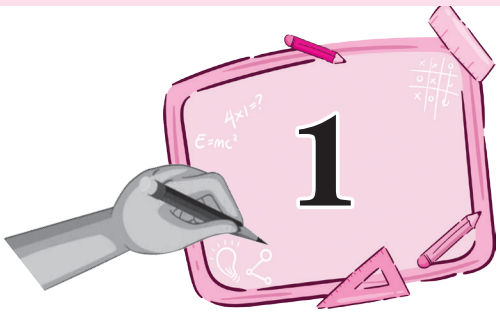


Integers

EXERCISE-1.1

1. (a) $|6 + 3| = |9| = 9$
(b) $-|-3 + 9| = -|6| = -6$
(c) $|-5 - 4| = |-9| = 9$
(d) $-|-8 + 2| = -|-6| = -6$

2. (a) Additive inverse of $7 = -7$
(b) Additive inverse of $-11 = 11$
(c) Additive inverse of $0 = 0$
(d) Additive inverse of $272 = -272$

3. (a) $7 - 8 \boxed{>} -5 - 0$
(b) $11 - 9 (-9) \boxed{=} 9 + 11$
(c) $6 - 15 \boxed{<} 6 - 10$
(d) $-2 + 7 \boxed{=} 7 - 2$

4. (a) $-25 - (-10) = -15$
Another pair $= 5 - 20 = -15$
We can write more pairs
(b) Sum is -27
$-15 + (-12) = -27$
$-30 + 3 = -27$
We can write more pairs
(c) Difference is 9
$18 - 9 = 9$
$-2 + 11 = 9$

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

6. (a) $12 + (-15)$
$12 - 15 = -3$
(b) $-32 + 22 = -10$
(c) $35 + (-22) = 35 - 22 = 13$
(d) $41 - 29 = 12$
(e) $76 - (-56) = 76 + 56 = 132$
(f) $-101 - (-99) = -101 + 99 = -2$
(g) $-63 - (-74) = -63 + 74 = 11$
(h) $58 + (-34) = 58 - 34 = 24$

7. (a) $(-5) + (-6) = -11$

Another pair = $(-8) + (-3) = -11$

(b) We can take two integers as 12 and – 1

$-1 - (12) = -13$

We can write more pairs

(c) We can take two integers as – 7 and – 12

$-7 - (-12) = -7 + 12 = 5$

(d) We can take two integers as – 2 and – 4

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

(e) We can take two integers as 2 and – 15 where different is 17

$2 - (-15) = 2 + 15 = 17$

8. Maximum temperature = 16°C

Minimum temperature = – 2°C

Fall in temperature = Maximum temperature – Minimum temperature

= 16° – (– 2) = 16 + 2 = 18°C

9. The sum of two integers = – 85

One of them = 50

Other integers = – 85 – (50)

= – 85 – 50 = – 135

10. Height of the plane above the sea level = 7500 m

Depth of submarine below the sea level = – 800 m

Distance between plane and submarine = 7500 m – (– 800) m

= (7500 + 800) m = 8300 m

EXERCISE-1.2

1. (a) False

Correct statement: 1 is the multiplicative. Identify of integers.

(b) False

Correct statement: $-7 - (-11) \neq -11 - (-7)$

(c) $0 - 72 = 72$ (False)

Correct statement: $0 - 72 = -72$

(d) True

(e) False

Correct statement: 0 is an integer which is its own additive inverse.

2. (a) Given

$a = 10, b = -2, c = 3$

We have $a + (b + c) = (a + b) + c$

$10 + (-2 + 3) = [10 + (-2)] + 3$

$10 + (1) = 8 + 3$

$11 = 11$

LHS = RHS

(b) $a = -5, b = 5, c = 11$

We have $a + (b + c) = (a + b) + c$

$-5 + (5 + 11) = (-5 + 5) + 11$

$-5 + 16 = +0 + 11$

$11 = 11$

LHS = RHS

(c) $a = -100, b = -200, c = -300$

We have $a + (b + c) = (a + b) + c$

$-100 + [(-200) + (-300)] = [(-100) + (-200)] + (-300)$

$-100 + (-500) = (-300) + (-300)$

$-600 = -600$

LHS = RHS

3. (a) $(-12) + 0 = 0 + (-12) = -12$ (Additive property of zero)

(b) $(-3) + (-20) = (-20) + (-3)$ (Commutative property)

(c) $16 + [(-2) + (-3)] = [16 + (-2)] + (-3)$ (Associative property)

(d) $147 + (-147) = 0$ (Additive inverse)

4. (a) $123 + (-356) + 277 + (-144)$

$= (123 + 277) + (-356 - 144)$

$= 400 + (-500) = 400 - 500 = -100$

(b) $(-14) + (-19) + (-26) + (-21)$

$= [(-14) + (-26)] + [(-19) + (-21)]$

$= (-40) + (-40) = -80$

(c) $519 + (-93) + 81$

$= (519 + 81) + (-93) = 600 - 93 = 507$

(d) $1009 + (-9) + 225$

$= (1009 - 9) + 225 = 1000 + 225 = 1225$

5. (a) $-12 - (-1) + (-27) - (-3 - 2)$

$= -12 + 1 - 27 - (-5) = -12 + 1 - 27 + 5$

$= -12 - 27 + 1 + 5 = -39 + 6 = -33$

(b) $[23 - (-9)] + [12 - (-6)]$

$= (23 + 9) + (12 + 6) = 32 + 18 = 50$

(c) $[\{(-26) - (-15)\} + \{23 + (-17)\}]$

$= [\{-26 + 15\} + \{23 - 17\}] = [-11 + 6] = -5$

(d) $[21 - (-75) + 15 - (-75) + 135 - (-5)]$

$= [21 + 75 + 15 + 75 + 135 + 5] = 326$

EXERCISE-1.3

1. (a) $(-25) \times 7 = -(25 \times 7) = -175$

(b) $(-8) \times (-15) = (8 \times 15) = 20$

(c) $(-163) \times 0 = 0$

(d) $(-12) \times (-2) \times 3 = (-12) \times [(-2) \times 3]$

$= (-12) \times [-(2 \times 3)] = (-12) \times [-6] = (12 \times 6) = 72$

(e) $(-10) \times (-5) \times 8 \times (-4) = [(-10) \times (-5)] \times [8 \times (-4)]$
$= (10 \times 5) \times [-(8 \times 4)] = 50 \times (-32) = -1600$

(f) $(-1) \times (-2) \times (-53) \times (-5) = [(-1) \times (-53)] \times [(-2) \times (-5)]$
$= 53 \times 10 = 530$

(g) $(-8) \times (-72) \times (-125) = [(-8) \times (-125)] \times (-72)$
$= 1000 \times (-72) = -72000$

(h) $(-5) \times (-4) \times (-3) \times (-2) \times (-1) = [(-5) \times (-2)] \times [(-4) \times (-3) \times (-1)]$
$= 10 \times (-12) = -120$

2. (a) $(-166) \times 1 = (-166)$ [Multiplicative identity]

(b) $57 \times 0 = 0$ [Property of zero]

(c) $3 \times [(-5) \times (-2)] = [3 \times -5] \times (-2)$ [Associative property]

(d) $(-4) \times [5 + (-8)] = (-4) \times 5 + (-4) \times (-8)$ [Distributive property]

(e) $(-21) \times 5 + (-7) \times (-21) = (-21) \times [5 + (-7)]$ [Distributive property]

3. (a) $a = -2$, $b = 5$, $c = -6$

We have $a \times (b \times c) = a \times b - a \times c$

$(-2)[5 - (-6)] = (-2)(5) - [(-2)(-6)]$

$-2[5 + 6] = -10 - 12$

$-2[11] = -22$

$-22 = -22$

LHS = RHS

(b) $a = -15$, $b = -3$, $c = 2$

$a \times (b - c) = a \times b - a \times c$

$(-15)(-3 - 2) = [-15(-3)] - [(-15)(2)]$

$-15(-5) = +45 - [-30]$

$75 = +45 + 30$

$75 = 75$

LHS = RHS

4. (a) $(-75) \times 173 + 173 \times (-25)$

$173 \times [(-75) + (-25)] = 173(-100) = -17{,}300$

(b) $(-21) \times 5 + (-7) \times (-21)$

$= (-21) \times [5 + (-7)] = (-21) \times (-2) = 42$

(c) $28 \times (-61) - (-272) \times (-61)$

$= (-61) \times [28 - (-272)] = -61 \times [28 + 272]$

$= -61 \times (300) = -18{,}300$

(d) $25 \times (-109)$

$= 25 \times (-100 - 9) = 25(-100) + (25)(-9)$

$= -2500 - 225 = -2725$

(e) -61×99

$= -61 \times (100 - 1) = -61 \times 100 + (-61)(-1)$

$= -6100 + 61 = -6039$

(f) $(-225) \times (-199) - (-225) \times (1)$

$= (-225) \times [(-199) - (1)] = (-225) \times [-199 - 1]$

$= (-225) \times (-200) = 45{,}000$

(g) $(-27) \times (-201)$
$= -27 \times (-200 - 1) = -27 \times (-200) + (-27)(-1)$
$= 5400 + 27 = 5427$

(h) $162 \times (-92) - (-162) \times (-5) - 162 \times 3$
$= 162[-92] + (162)(-5) - (162) \times 3$
$= 162[-92 - 5 - 3] = 162[-100] = -16200$

5. (a) Negative sign
(b) Negative sign
(c) Positive sign
(d) Negative sign

6. Maximum temperature during a day in the month of January = 3°C
Minimum temperature during the night = – 4°C
Difference between = 3 – (– 4) = 7°C

7. For any integer n, $(-1) \times n$ is equal to $-n$ as shown be low
$(-1) \times n = -n$ (where n is any integer)

EXERCISE-1.4

1. (a) $(-75) \div 0 = 0$ (Incorrect)
$(-75) \div 0$ = not defined (Correct)

(b) $(-63) \div (-9) = -7$ (Incorrect)
$(-63) \div (-9) = 7$ (Correct)

(c) $(-12) \div (252) = -21$ (Incorrect)
$-12 \div 252 = \frac{-1}{21}$ (Correct)

(d) $(-179) \div (-1) = -179$ (Incorrect)
$(-179) \div (-1) = 179$ (Correct)

(e) $1 \div (-565) = -565$ (Incorrect)
$1 \div (-565) = \frac{-1}{565}$ (Correct)

(f) $(12 \div 4) \div 3 \neq 12 \div (4 \div 3)$ (Correct)

(g) $(-126) \div (9) = -24$ (Incorrect)
$(-126) \div 9 = -14$ (Correct)

(h) $360 \div (-45) = 18$ (Incorrect)
$360 \div (-45) = -8$ (Correct)

2. (a) $[66 + (-1)] \div [9 - (-4)]$
$= (66 - 1) \div (9 + 4) = 65 \div 13 = 5$

(b) $[40 + (-100)] \div [-9 + 29]$
$= [40 - 100] \div [20] = -60 \div 20 = -3$

(c) $(-153) \div [45 (-5)]$
$(-153) \div (-225)$
$\frac{\cancel{153}}{\cancel{225}} \quad \frac{17}{25}$

(d) [1024 ÷ (– 32)] + [(– 125) + 5]

(– 32) + (– 25) = – 32 – 25 = – 57

3. (a) – 8 × 178 × 25

= (– 8 × 25) × 175

= – 200 × 178 = – 35,600

(b) 4 × (– 36) × 150

= (4 × 150) × (– 36) = 600 × – 36 = – 21,600

(c) 8 × 53 × (– 125)

= [8 × (– 125)] × 53 = (– 1000) × 53 = – 53000

(d) – 8 × 4 × (– 9) × (– 5)

= [(– 8) × (– 5)] × [4 × (– 9)] = 40 × (– 36) = – 1440

(e) [– 4 × 25] × [75 × (– 2)]

= (– 100) × (– 150) = 15,000

(f) – 4 × 7 × 50

= (– 4 × 50) × 7 = – 200 × 7 = – 1400

4. (a) $\frac{-\overset{1}{\cancel{5}} \times \overset{13}{\cancel{65}}}{-\cancel{5} \times \underset{1}{\cancel{5}}} = 13$

(b) – 19 × (100 + 2)

= – 19 × 100 + (– 19) × 2

= – 1900 + (– 38) = – 1938

(c) – 4 × (– 3 × 2) + (– 3) × (– 1)

= (– 4 × 2) (– 3) + (– 3) × (– 1)

= – 3 [– 8 – 1] = – 3 × – 9 = 27

(d) – 42 (40) + (– 42) (5)

= – 1680 + (– 210) = – 1890

(e) 32 × (– 42) ÷ (32) × (– 6)

$\frac{-\overset{7}{\cancel{42}} \times \overset{1}{\cancel{32}}}{-\underset{1}{\cancel{6}} \times \underset{1}{\cancel{32}}} = 7$

(f) (– 26) × (– 41)

= – 26 × (– 40 – 1)

= – 26 (– 40) + (– 26) (– 1)

= 1040 + 26 = 1066

5. (a) –76 ÷ (– 4) = 19

(b) 0 ÷ 439 = 0

(c) 2575 ÷ (– 25) = – 103

(d) – 600 ÷ 30 = – 20

(e) – 4968 ÷ (– 9) = 552

(f) – 1221 ÷ 11 = – 111

6. $a = 24, b = 8, c = 4$

$a \div (b + c) \neq (a \div b) + (a \div c)$

$24 \div (8 + 4) \neq (24 \div 8) + (24 \div 4)$

$24 \div (12) \neq 3 + 6$

$2 \neq 9$

LHS $\neq$ RHS

Hence verified

7. Let the integer = x

A.T.Q

$x \times (-2) = -100$

$x = \frac{-100}{-2} = +50$

8. (i) Marks are given for 1 correct answer = 2

Marks are given for 22 correct answer = $22 \times 2 = 44$

Marks deduct for 1 incorrect answer = (-1)

Marks deduct for 8 incorrect answer = $8 \times (-1) = -8$

His total score = $44 - 8 = 36$

(ii) Neha attempt question = $30 - 6 = 24$

Correct answer = 17

Incorrect answer = $24 - 17 = 7$

Neha score marks for 17 correct answer = $17 \times 2 = 34$

Neha deduct marks for 7 incorrect answer = $7 \times (-1) = -7$

Her total score is $34 - 7 = 27$

9. If we multiply $-59 \times 76 = -4484$

$\therefore$ The sign of the product is negative

NCERT CORNER

EXERCISE-1.1

1. (a) Bangalore - 22°C

Ooty - 14°C

Shimla - 5°C

Srinagar - – 2°C

Lahulspiti - – 8°C

(b) The temperature of the hottest place Bangalore = 22°C

The temperature of the coldest place Lahulspiti = – 8°C

Difference = 22°C – (– 8°C) = 30°C

(c) The temperature of Srinagar = – 2°C

The temperature of Lahulspiti = – 8°C

Difference = – 2°C – (– 8°C) = 6°C

(d) The temperature of Srinagar and Shimla = 5°C + (– 2°C) = 5°C – 2°C = 3°C
The temperature at Shimla = 5°C
∴ 3°C < 5°C
Thus, temperature of Srinagar and Shimla taken together is less than the temperature at Shimla.
Now, temperature of Srinagar = – 2°C
∴ 3°C > – 2°C
No, it is not less than the temperature at Srinagar.

2. Total marks got by Jack = 25 + (– 5) + (– 10) + 15 + 10 = 35
Thus, 35 marks are got by Jack in a quiz.

3. On Monday, temperature at Srinagar = – 5°C
On Tuesday, temperature dropped = 2°C
∴ Temperature on Tuesday = – 5°C – 2°C = – 7°C
On Wednesday, temperature rose up = 4°C
∴ Temperature on Wednesday = (– 7°C + 4°C) = – 3°C

4. Height of a place above the sea level = 5000 m
Floating a submarine below the sea level = 1200 m
∴ The vertical distance between the plane and the submarine = 5000 + 1200 = 6200 m

5. Deposit amount = ₹ 2000
Withdrawal amount = ₹ 1642
∴ Balance = ₹ (2000 – 1642) = ₹ 358

6. According to the number line, Rita moves towards east is represented by a positive integer. But she moves in opposite direction means Rita moves west, is represented by negative integers.
Distance from A to B = 20 km
Distance from B to C = 30 km
Distance from A to C = 20 – 30 = – 10 km

7. (i) Taking rows = 5 + (– 1) + (– 4) = 5 – 5 = 0
(– 5) + (– 2) + (7) = – 7 + 7 = 0
0 + 3 + (– 3) = 3 – 3 = 0
Taking columns = 5 + (– 5) + 0 = 0
(– 1) + (– 2) + 3 = 0
(– 4) + (7) + (– 3) = 0
Taking diagonals = 5 + (– 2) + (– 3) = 0
(– 4) + (– 2) + (0) = – 6
This box is not a magic square because all the sums are not equal.

(ii) Taking rows = (+ 1) + (– 10) + 0 = 9
(– 4) + (– 3) + (– 2) = – 9
(– 6) + (4) + (– 7) = – 9
Taking columns = (1) + (– 4) + (– 6) = – 9
(– 10) + (– 3) + (4) = – 9
0 + (– 2) + (– 7) = – 9
Taking diagonals = 1 + (– 3) + (– 7) = – 9
0 + (– 3) + (– 6) = – 9
This box is a magic square because all the sums are equal.

8. (a) $a = 21, b = 18$

$a - (-b) = a + b$

$21 - (-18) = 21 + 18$

$21 + 18 = 21 + 18$

LHS = RHS

(b) $a = 118, b = 125$

$a - (-b) = a + b$

$118 - (-125) = 118 + 125$

$118 + 125 = 118 + 125$

LHS = RHS

(c) $a = 75, b = 84$

$a - (-b) = a + b$

$75 - (-84) = 75 + 84$

$75 + 84 = 75 + 84$

LHS = RHS

(d) $a = 28, b = 11$

$a - (-b) = a + b$

$28 - (-11) = 28 + 11$

$28 + 11 = 28 + 11$

LHS = RHS

9. (a) $-8 + (-4) \square (-8) - (-4)$

$-8 + (-4) \square (-8) + 4$

$-8 - 4 \square -4$

$-12 \boxed{<} -4$

(b) $-3 + 7 - (19) \square 15 - 8 + (-9)$

$-3 + 7 - 19 \square 15 - 8 - 9$

$-22 + 7 \square 15 - 17$

$-15 \boxed{<} -2$

(c) $23 - 41 + 11 \square 23 - 41 - 11$

$+23 - 30 \square 23 - 52$

$-7 \boxed{>} -29$

(d) $39 + (-24) - (15) \square 36 + (-52) - (-36)$

$39 - 24 - 15 \square 36 - 52 + 36$

$39 - 39 \square 72 - 52$

$0 \boxed{<} 20$

(e) $-231 + 79 + 51 \square -399 + 154 + 81$

$-231 + 130 \square -399 + 240$

$-101 \boxed{>} -159$

10. (i) He jumps 3 steps down and jump back 2 steps up

First jump = 1 + 3 = 4 steps

Second jump = 4 – 2 = 2 steps

Third jump = 2 + 3 = 5 steps

Fourth jump = 5 – 2 = 3 steps

Fifth jump = 3 + 3 = 6 steps

Sixth jump = 6 – 2 = 4 steps

Seventh jump = 4 + 3 = 7 steps

Eighth jump = 7 – 2 = 5 steps

Nineth jump = 5 + 3 = 8 steps

Tenth jump = 8 – 2 = 6 steps

Eleventh jump = 6 + 3 = 9 steps

He will reach ninth steps in 11 jumps

(ii) He jumps four steps and then jumps down 2 steps

Thus monkey reach back on the first step in fifth jump.

(iii) (a) $-3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 - 3 + 2 = -8$

(b) $4 - 2 + 4 - 2 + 4 - 2 + 4 - 2 = 8$

The sum 8 in (b) represents going up by eight steps.

EXERCISE-1.2

1. (a) One pair whose sum is $-7 = -5 + (-2) = -7$

(b) One pair whose difference is $-10 = -2 - 8 = -10$

(c) One pair whose sum is $0 = -5 + 5 = 0$

2. (a) $-2 - (-10) = -2 + 10 = 8$

(b) $(-7) + 2 = -5$

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

3. Team A scored = – 40, 10, 0

Team B scored = 10, 0, – 40

Total score of Team A = $-40 + 10 + 0 = -30$

Total score of Team B = $10 + 0 + -40 = -30$

Thus, scores of both teams are same.

4. (i) $(-5) + (-8) = -8 + (-5)$ [Commutative property]

(ii) $-53 + 0 = -53$ [Zero additive property]

(iii) $17 + (-17) = 0$ [Additive identity]

(iv) $[13 + (-12)] + (-7) = 13 + [(-12) + (-7)]$ [Additive property]

(v) $(-4) + [15 + (-3)] = [-4 + 15] + (-3)$ [Associative property]

EXERCISE-1.3

1. (a) $3 \times (-1) = -3$

(b) $(-1) \times 225 = -225$

(c) $(-21) \times (-30) + 630$

(d) $(-316) \times (-1) = 316$

(e) $(-15) \times 0 \times (-18) = 0$

(f) $(-12) \times (-11) \times 10 = 132 \times 10 = 1320$

(g) $9 \times (-3) \times (-6) = 9 \times 18 = 162$

(h) $(-18) \times (-5) \times (-4) = (-18) \times (20) = -360$

(i) $(-1) \times (-2) \times (-3) \times 4 = 2 \times (-12) = -24$

(j) $(-3) \times (-6) \times (-2) \times (-1) = 18 \times 2 = 36$

2. (a) $18 \times [7 + (-3)] = [18 \times 7] + [18 \times (-3)]$

$18 \times (4) = 126 + (-54)$

$72 = 72$

LHS = RHS

(b) $(-21) \times [(-4) + (-6)] = [(-21) \times (-4)] + [(-21) \times (-6)]$

$(-21) \times [-10] = 84 + 126$

$210 = 210$

LHS = RHS

3. (i) $(-1) \times a = -a$ where a is an integer

(ii) (a) $(-1) \times (-22) = 22$

(b) $(-1) \times 37 = -37$

(c) $0 \times -1 = 0$

4. $(-1) \times 5 = -5$

$(-1) \times 4 = -4$

$(-1) \times 3 = -3$

$(-1) \times 2 = -2$

$(-1) \times 1 = -1$

$(-1) \times 0 = 0$

$(-1) \times (-1) = 1$

Thus we can conclude that this pattern shows the product of one negative integer and one positive integer is negative integer whereas the product of two negative integers is a positive integer.

5. (a) $26 \times (-48) + (-48) \times (-36)$

$= (-48) \times [26 + (-36)]$ [Distributive property]

$= -48 \times (-10) = +480$

(b) $8 \times 53 \times (-125)$

$= 53 \times [8 \times (-125)]$ [Commutative property]

$= 53 \times (-1000) = -53000$

(c) $15 \times (-25) \times (-4) \times (-10)$

$= 15 \times [(-25) \times (-4) \times (-10)]$ [Commutative property]

$= 15 \times [-1000] = -15000$

(d) $(-41) \times 102$

$= (-41) \times (100 + 2)$

$= [(-41) \times 100] + (-41) \times (2)$ [Distributive property]

$= -4100 - 82 = -4182$

(e) $625 \times (-35) + (-625) \times 65$

$= 625 \times [-35 - 65]$ [Distributive property]

$= 625 \times (-100) = -62500$

(f) $7 \times (50 - 2)$

$= 7 \times 50 + 7 \times (-2)$ [Distributive property]

$= 350 - 14 = 336$

(g) $(-17) \times (-29)$

$= (-17) \times [-30 + 1]$ [Distributive property]

$= [(-17)(-30)] + [(-17)(1)]$

$= 510 - 17 = 493$

(h) $(-57) \times (-19) + 57 \times 1$

$= 57\ (19 + 1)$ [Distributive property]

$= 57\ (20) = 1140$

6. Present room temperature = 40°C

Decreasing the temperature every hour = 5°C

Room temperature after 10 hours = $40°C + 10 \times (-5°C)$

$= 40°C - 50°C = -10°C$

Thus, the room temperature after 10 hrs is – 10°C after the process begins.

7. (i) Mohan gets marks for four correct questions = 4 × 5 = 20
He gets marks for 6 incorrect question = 6 × (– 2) = – 12
∴ Total scores of Mohan = (4 × 5) + [6 × (– 2)] = 20 – 12 = 8
Thus, Mohan gets 8 marks in a class test.

(ii) Reshma gets marks for five correct questions = 5 × 5 = 25
She gets marks for 5 incorrect question = 5 × (– 2) = – 10
Total scores of Reshma = 25 – 10 = 15

(iii) Heena gets marks for 2 correct questions = 2 × 5 = 10
Heena gets marks for 5 incorrect question = 5 × (– 2) = – 10
Total score of Heena = 10 – 10 = 0

8. (a) Profit on selling 3000 bags of white cement = 3000 × 8 = ₹ 24000
Loss of selling 5000 bags of grey cement = 5000 × 5 = ₹ 25,000
Since P < L
∴ His total loss on selling the grey cement bags = Loss – Profit = ₹ (25000 – 24000)
= ₹ 1000

(b) Let the number of bags of white cement be x
A.T.Q
L = P
∴ $5 \times 6400 = x \times 8$

$$x = \frac{5 \times 6400}{8} = 4000 \text{ bags}$$

9. (a) (– 3) × (– 9) = 27
(b) 5 × (– 7) = – 35
(c) 7 × (– 8) = – 56
(d) (– 11) × (– 12) = 132

EXERCISE-1.4

1. (a) $(-30) \div 10 = -30 \times \frac{1}{10} = -3$

(b) $50 \div (-5) = 50 \times \left(\frac{-1}{5}\right) = -10$

(c) $(-36) \div (-9) = (-36) \times \left(\frac{-1}{9}\right) = 4$

(d) $(-49) \div 49 = -49 \times \frac{1}{49} = -1$

(e) $13 \div [(-2) + 1] = 13 \div (-1) = 13 \times \frac{-1}{1} = -13$

(f) $0 \div (-12) = 0 \times \frac{-1}{12} = 0$

(g) $(-31) \div [(-30) + (-1)] = (-31) \div [-31] = -31 \times \frac{-1}{31} = 1$

(h) $[36 \div 12] \div 3 = \left(36 \times \frac{1}{12}\right) \times \frac{1}{3} = 3 \times \frac{1}{3} = 1$

(i) $[(-6) + 5] \div [(-2) + 1] = (-1) \div (-1) = -1 \times \frac{-1}{1} = +1$

2. (a) $a = 12, b = -4, c = 2$

$a \div (b + c) \neq (a \div b) + (a \div c)$

$12 \div (-4 + 2) \neq [12 \div (-4)] + [12 \div (2)]$

$12 \div (-2) \neq (-3) + (6)$

$-6 \neq 3$

LHS $\neq$ RHS

(b) $a = (-10), b = 1, c = 1$

$a \div (b + c) \neq (a \div b) + (a \div c)$

$(-10) \div (1 + 1) \neq (-10 \div 1) + (-10 \div 1)$

$-10 \div (2) \neq -10 + -10$

$-5 \neq -20$

LHS $\neq$ RHS

3. (a) $369 \div 1 = 369$

(b) $(-75) \div 75 = -1$

(c) $(-206) \div (-206) = 1$

(d) $-87 \div (-1) = 87$

(e) $(-87) \div 1 = -87$

(f) $(-48) \div 48 = -1$

(g) $20 \div (-10) = -2$

(h) $-12 \div (4) = -3$

4. (i) $-6 \div 2 = -3$

(ii) $9 \div (-3) = -3$

(iii) $12 \div (-4) = -3$

(iv) $(-9) \div 3 = -3$

(v) $-15 \div 5 = -3$

5. The temperature decreases 2°C = 1 hour

The temperature decrease 1°C = $\frac{1}{2}$ hour

The temperature decrease 18°C = $\frac{1}{2} \times 18 = 9$ hours

Total time = 12 noon + 9 hours = 21 hours = 9 p.m.

The temperature at 12 noon = 10°C

The temperature decrease by 2°C every hour

The temperature decrease in 12 hours = 2°C × 12 = – 24°C

At midnight, the temperature will be = 10°C + (– 24°C) = – 14°C

6. (i) Marks given for 1 correct answer = 3

Marks given for 12 correct answer = 3 × 12 = 36

Radhika scored 20 marks

$\therefore$ marks obtained for incorrect answer = 20 – 36 = – 16

Now, marks given for one incorrect answer = – 2

$\therefore$ Number of incorrect answer = $\frac{-16}{-2} = 8$

(ii) Marks given for seven correct answer = 3 × 7 = 21

Mohini scores = – 5

Marks obtained for incorrect answer = – 5 – 21 = – 26

Now marks given for one incorrect answer = – 2

$\therefore$ Number of incorrect answer = – 26 ÷ (– 2) = 13

7. Starting position of mine shaft is 10 m above the ground but it moves in opposite direction so it travels the distance (– 350) m below the ground.

So total distance covered by mine shaft - 10 m – (– 350) m = 10 + 350 = 360 m

Now, time taken to cover a distance of 6 m by it = 1 min

So, time-taken to cover a distance of 1 m of by it = $\frac{1}{6}$ min

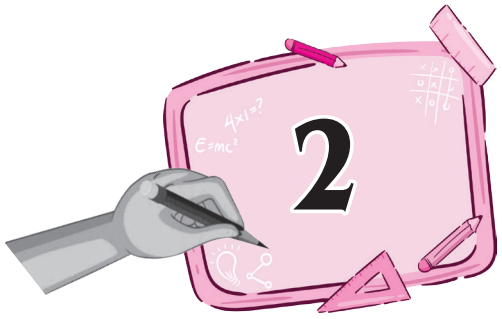
$\therefore$, time taken to cover a distance of 360 by it = $\frac{1}{6} \times 360$ = 60 min = 1 hr

SUBJECT ENRICHMENT EXERCISE

I. (1) Division
(2) 1
(3) 0
(4) – 7
(5) 7
(6) 0 (zero)
(7) – 545
(8) 9
(9) + 4
(10) Can be positive or negative

II. (a) 24
(b) – *a*
(c) 6
(d) – 15
(e) Integer itself

III. (a) True
(b) True
(c) True
(d) False
(e) False
(f) False



Fractions and Decimals

EXERCISE-2.1

1. (a) $\frac{2}{3}$ = Proper fraction

(b) $5\frac{1}{4}$ = Mixed fraction

(c) $\frac{8}{7}$ = Improper fraction

(d) $\frac{1}{5}$ = Proper fraction

(e) $\frac{4}{9}$ = Proper fraction

2. (a) $\frac{2}{3} = 0\frac{2}{3}$

(b) $\frac{9}{4} = 2\frac{1}{4}$

(c) $\frac{17}{16} = 1\frac{1}{16}$

(d) $\frac{\cancel{250}^{125}}{\cancel{12}_{6}} = \frac{125}{6} = 20\frac{5}{6}$

3. (a) $2\frac{4}{5} = \frac{14}{5}$

(b) $9\frac{1}{2} = \frac{19}{2}$

(c) $14\frac{2}{3} = \frac{44}{3}$

(d) $11\frac{1}{4} = \frac{45}{4}$

4. (a) $\frac{2}{7} = \frac{2\times2}{7\times2} = \frac{2\times3}{7\times3} = \frac{2\times4}{7\times4} = \frac{2\times5}{7\times5}$

$\therefore \frac{4}{14} = \frac{6}{21} = \frac{8}{28} = \frac{10}{35}$

(b) $\frac{3}{11} = \frac{3\times2}{11\times2} = \frac{3\times3}{11\times3} = \frac{3\times4}{11\times4} = \frac{3\times5}{11\times5}$

$\therefore \frac{6}{22} = \frac{9}{33} = \frac{12}{44} = \frac{15}{55}$

(c) $\frac{5}{9} = \frac{5\times2}{9\times2} = \frac{5\times3}{9\times3} = \frac{5\times4}{9\times4} = \frac{5\times5}{9\times5}$

$\therefore \frac{10}{8} = \frac{15}{27} = \frac{20}{36} = \frac{25}{45}$

(d) $\frac{4}{13} = \frac{4\times2}{13\times2} = \frac{4\times3}{13\times3} = \frac{4\times4}{13\times4} = \frac{4\times5}{13\times5}$

$\therefore \frac{8}{26} = \frac{12}{39} = \frac{16}{52} = \frac{20}{65}$

5. (a) $\frac{2}{15}, \frac{1}{15}$

Yes, this pair of fractions are like fraction because its denominator are same.

(b) $\frac{7}{9}, \frac{2}{5}$

No, this pair of fraction are unlike fraction because its denominator are different.

(c) $\frac{11}{45}, \frac{13}{45}$

Yes, this pair of fraction are like fraction because its denominator are same.

(d) $\frac{21}{44}, \frac{21}{41}$

No, this pair of fraction are unlike fraction because its denominator are different.

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

L.C.M of $4, 5$ and $7 = 140$

$\frac{2 \times 20}{7 \times 20} = \frac{40}{140}, \frac{3 \times 28}{5 \times 28} = \frac{84}{140}$

$\frac{1 \times 35}{4 \times 35} = \frac{35}{140}, \frac{4 \times 28}{5 \times 28} = \frac{112}{140}$

Arrange in ascending order

$\frac{35}{140} < \frac{40}{140} < \frac{84}{140} < \frac{112}{140}$

$\therefore \frac{1}{4} < \frac{2}{7} < \frac{3}{5} < \frac{4}{5}$

(b) $\frac{9}{11}, \frac{2}{5}, \frac{7}{11}, \frac{3}{10}$

L.C.M of $5, 10$ and $11 = 110$

$\frac{9 \times 10}{11 \times 10} = \frac{90}{110}, \frac{2 \times 22}{5 \times 22} = \frac{44}{110}$

$\frac{7 \times 10}{11 \times 10} = \frac{70}{110}, \frac{3 \times 11}{10 \times 11} = \frac{33}{110}$

Arrange in ascending order

$\frac{33}{110} < \frac{44}{110} < \frac{70}{110} < \frac{90}{110}$

$\therefore \frac{3}{10} < \frac{2}{5} < \frac{7}{11} < \frac{9}{11}$

(c) $\frac{2}{3}, \frac{6}{4}, \frac{3}{9}, \frac{7}{10}$

L.C.M of $3, 4, 9$ and $10 = 180$

$\frac{2 \times 60}{3 \times 60} = \frac{120}{180}, \frac{6 \times 45}{4 \times 45} = \frac{270}{180}$

$\frac{3 \times 20}{9 \times 20} = \frac{60}{180}, \frac{7 \times 18}{10 \times 18} = \frac{126}{180}$

Arrange in ascending order

$\frac{60}{180} < \frac{120}{180} < \frac{126}{180} < \frac{270}{180}$

$\therefore \frac{3}{9} < \frac{2}{3} < \frac{7}{10} < \frac{6}{4}$

(d) $\frac{17}{9}, \frac{18}{9}, \frac{10}{9}, \frac{11}{9}$

Arrange in ascending order

$\frac{10}{9} < \frac{11}{9} < \frac{17}{9} < \frac{18}{9}$

7. (a) $\frac{5}{16}, \frac{7}{8}, \frac{1}{4}, \frac{9}{4}$

L.C.M of $4, 8$ and $16 = 16$

$\frac{5}{16}, \frac{7 \times 2}{8 \times 2} = \frac{14}{16}, \frac{1 \times 4}{4 \times 4} = \frac{4}{16}$

$\frac{9 \times 4}{4 \times 4} = \frac{36}{16}$

Arrange in descending order

$\frac{36}{16} > \frac{14}{16} > \frac{5}{16} > \frac{4}{16}$

$\therefore \frac{9}{4} > \frac{7}{8} > \frac{5}{16} > \frac{1}{4}$

(b) $\frac{7}{24}, \frac{3}{8}, \frac{5}{12}, \frac{11}{24}$

L.C.M of $8, 12$ and $24 = 24$

$\frac{7}{24}, \frac{3 \times 3}{8 \times 3} = \frac{9}{24}, \frac{5 \times 2}{12 \times 2} = \frac{10}{24}, \frac{11}{24}$

Arrange in descending order

$\frac{11}{24} > \frac{10}{24} > \frac{9}{24} > \frac{7}{24}$

$\therefore \frac{11}{24} > \frac{5}{12} > \frac{3}{8} > \frac{7}{24}$

(c) $\frac{7}{19}, \frac{7}{21}, \frac{7}{5}, \frac{7}{2}$

Arrange in descending order

$\therefore \frac{7}{2} > \frac{7}{5} > \frac{7}{19} > \frac{7}{21}$

(d) $\frac{1}{9}, \frac{2}{3}, \frac{4}{7}, \frac{3}{10}$

L.C.M of $3, 7, 9$ and $10 = 630$

$\frac{1 \times 70}{9 \times 70} = \frac{70}{630}, \frac{2 \times 210}{3 \times 210} = \frac{420}{630}$

$\frac{4 \times 90}{7 \times 90} = \frac{360}{630}, \frac{3 \times 63}{10 \times 63} = \frac{189}{630}$

Arrange in descending order

$\frac{420}{630} > \frac{360}{630} > \frac{189}{630} > \frac{70}{630}$

$\therefore \frac{2}{3} > \frac{4}{7} > \frac{3}{10} > \frac{1}{9}$

8. (a) $\frac{3}{7} + \frac{2}{5}$

$\frac{3 \times 5 + 2 \times 7}{35} = \frac{15 + 14}{35} = \frac{29}{35}$

(b) $3\frac{1}{4} + 2\frac{3}{5} = \frac{13}{4} = \frac{13}{5}$

$\frac{65 + 52}{20} = \frac{117}{20} = 5\frac{17}{20}$

(c) $\frac{8}{1} + \frac{2}{5} = \frac{40 + 2}{5} = \frac{42}{5} = 8\frac{2}{5}$

(d) $\frac{11}{12} + 2\frac{1}{2} = \frac{11}{12} + \frac{5}{2} = \frac{11 + 30}{12} = \frac{41}{12} = 3\frac{5}{12}$

9. (a) $2\frac{1}{10} - 3\frac{1}{5} = \frac{21}{10} - \frac{16}{5}$

$= \frac{21 - 32}{10} = \frac{-11}{10} = -1\frac{1}{10}$

(b) $\frac{24}{45} - \frac{3}{5} = \frac{24 - 27}{45} = \frac{-3}{45} = \frac{-1}{15}$

(c) $\frac{7}{18} - \frac{2}{9} = \frac{7 - 4}{18} = \frac{3}{18}$

(d) $15 - 7\frac{1}{2} = 15 - \frac{15}{2} = \frac{30 - 15}{2} = \frac{15}{2} = 7\frac{1}{2}$

10. Length of rectangle = $12\frac{1}{4}\text{ cm} = \frac{49}{4}\text{ cm}$

Breadth of rectangle = $10\frac{3}{7}\text{ cm} = \frac{73}{7}\text{ cm}$

Perimeter of rectangle $= 2\,(L+B)$

$$= 2\left(\frac{49}{4} + \frac{73}{7}\right)\text{ cm}$$

$$= 2 \times \left(\frac{49 \times 7 + 73 \times 4}{28}\right)$$

$$= \cancel{2} \times \left(\frac{343 + 292}{\cancel{28}_{14}}\right)$$

$$= \frac{635}{14} = 45\frac{5}{14}\text{ cm}$$

11. Perimeter of triangle = $12\frac{1}{4}\text{ cm} = \frac{49}{4}\text{ cm}$

Length of I side of triangle = $2\frac{1}{2}\text{ cm} = \frac{5}{2}\text{ cm}$

Length of II side of triangle = $3\frac{1}{4}\text{ cm} = \frac{13}{4}\text{ cm}$

Length of III side of triangle $= \frac{49}{4}\text{ cm} - \left(\frac{5}{2} + \frac{13}{4}\right)\text{ cm}$

$$= \frac{49}{4} - \left(\frac{10 + 13}{4}\right)\text{ cm}$$

$$= \frac{49}{4} - \frac{23}{4} = \frac{\cancel{26}^{13}}{\cancel{4}_{2}}$$

$$= \frac{13}{2} = 6\frac{1}{2}\text{ cm}$$

The third side of Δ = $6\frac{1}{2}\text{ cm}$

12. Length of first piece of lace = $2\frac{1}{4}\text{ m} = \frac{9}{4}\text{ m}$

Length of second piece of lace = $2\frac{1}{4}\text{ m} = \frac{9}{4}\text{ m}$

Total length of lace bought by tailor $= \frac{9}{4}\text{ m} + \frac{9}{4}\text{ m}$

$$= \frac{9 + 9}{4} = \frac{\cancel{18}^{9}}{\cancel{4}_{2}} = \frac{9}{2}\text{ m}$$

Length of the lace's used for stitching dresses $= 2\frac{1}{4}$ m $= \frac{9}{4}$ m

Length of remaining lace $= \left(\frac{9}{2} - \frac{9}{4}\right)$ m $= \frac{18-9}{4} = \frac{9}{4}$ m

EXERCISE-2.2

1. (a) $\frac{15}{32} \times 16$

$\frac{15}{\cancel{32}_{2}} \times \frac{\overset{1}{\cancel{16}}}{1} = \frac{15}{2} = 7\frac{1}{2}$

(b) $\frac{2}{\cancel{3}_{1}} \times \overset{14}{\cancel{42}} = 2 \times 14 = 28$

(c) $2\frac{1}{8} \times 25 = \frac{17}{8} \times 25 = \frac{425}{8} = 53\frac{1}{8}$

(d) $2\frac{2}{7} \times 35 = \frac{16}{\cancel{7}} \times \frac{\overset{5}{\cancel{35}}}{1} = 80$

(e) $\frac{4}{9} \times 10 = \frac{40}{9} = 4\frac{4}{9}$

(f) $2 \times \frac{1}{8} = \frac{\overset{1}{\cancel{2}}}{1} \times \frac{1}{\cancel{8}_{4}} = \frac{1}{4}$

(g) $7\frac{2}{3} \times 9 = \frac{23}{\cancel{3}_{1}} \times \frac{\overset{3}{\cancel{9}}}{} = 69$

(h) $6 \times \frac{\overset{1}{\cancel{2}}}{\cancel{18}_{9}} = \frac{\overset{2}{\cancel{6}}}{9_{3}} = \frac{2}{3}$

(i) $5 \times 2\frac{3}{5} = \frac{\overset{1}{\cancel{5}}}{\cancel{1}_{1}} \times \frac{13}{\cancel{5}_{1}} = 13$

2. (a) (i) $\frac{1}{4}$ of 20

$\frac{1}{\cancel{4}_{1}} \times \overset{5}{\cancel{20}} = 5$

(ii) $\frac{1}{4}$ of $32 = \frac{1}{\cancel{4}_{1}} \times \overset{8}{\cancel{32}} = 8$

(iii) $\overset{24}{\cancel{48}} \times \frac{1}{\cancel{2}_{1}} = 24$

(b) (i) $\frac{4}{5}$ of 35

$\frac{4}{\cancel{5}_{1}} \times \overset{7}{\cancel{35}} = 28$

(ii) $\frac{4}{5}$ of $60 = \frac{4}{\cancel{5}_{1}} \times \overset{12}{\cancel{60}} = 48$

(iii) $\frac{4}{5}$ of $175 = \frac{4}{\cancel{5}} \times \overset{35}{\cancel{175}} = 140$

3. Amit read book in 1 hour = $\frac{1}{3}$ of 1hr $= \frac{1}{3} \times 1 = \frac{1}{3}$

Amit read book in $4\frac{1}{5}$ hours $\left(\frac{21}{5}\text{hr}\right) = \frac{1}{\cancel{3}_{1}} \times \frac{\overset{7}{\cancel{21}}}{5} = \frac{7}{5}$

$\therefore$ He read book in $4\frac{1}{5}$ hours $= \frac{7}{5}$

4. Thickness of slice = $\frac{8}{25}$ cm

Height of a package containing 20 slices $= \frac{8}{\cancel{25}_{5}} \times \overset{4}{\cancel{20}} = \frac{32}{5}$ cm

EXERCISE-2.3

1. (a) $\frac{7}{8} \times \frac{4}{3} = \frac{7}{\cancel{8}_{2}} \times \frac{\overset{1}{\cancel{4}}}{3} = \frac{7}{6}$

(b) $\frac{11}{13} \times \frac{13}{22} = \frac{\overset{1}{\cancel{11}} \times \overset{1}{\cancel{13}}}{\cancel{13}_{1} \times \cancel{22}_{2}} = \frac{1}{2}$

(c) $\frac{\overset{14}{\cancel{28}}}{\cancel{45}_{9_{3}}} \times \frac{\overset{1}{\cancel{3}}}{\cancel{26}_{13}} = \frac{14}{39}$

(d) $\frac{\overset{1}{\cancel{16}}}{\cancel{21}_{3}} \times \frac{\overset{1}{\cancel{7}}}{\cancel{64}_{4}} = \frac{1}{12}$

(e) $\frac{\overset{1}{\cancel{8}}}{\cancel{11}_{1}} \times \frac{\overset{3}{\cancel{33}}}{\cancel{64}_{8}} = \frac{3}{8}$

(f) $\frac{\overset{3}{\cancel{9}}\overset{9}{\cancel{27}}}{\cancel{81}_{\cancel{3}_{1}}} \times \frac{\overset{1}{\cancel{25}}}{\cancel{36}_{12_{4}}} = \frac{3}{4}$

2. (a) $\frac{1}{10} \times \frac{71}{70} = \frac{71}{700}$

(b) $\frac{3}{7} \times \frac{153}{10} = \frac{459}{70} = 6\frac{39}{70}$

(c) $7 \times 3\frac{2}{7} = \overset{1}{\cancel{7}} \times \frac{23}{\cancel{7}_{1}} = 23$

(d) $\frac{1}{4} \times 6\frac{12}{17} = \frac{1}{\cancel{4}_{2}} \times \frac{\overset{57}{\cancel{114}}}{17} = \frac{57}{34} = 1\frac{23}{34}$

(e) $5\frac{1}{3} \times 8\frac{1}{2} = \frac{\overset{8}{\cancel{16}}}{3} \times \frac{17}{\cancel{2}_{1}} = \frac{136}{3} = 45\frac{1}{3}$

(f) $7\frac{1}{4} \times 2\frac{3}{10} = \frac{29}{4} \times \frac{23}{10} = \frac{667}{40} = 16\frac{27}{40}$

(g) $15 \times 10\frac{3}{2} = 15 \times \frac{23}{2} = \frac{345}{2} = 172\frac{1}{2}$

(h) $\frac{3}{2} \times 8\frac{1}{2} = \frac{3}{2} \times \frac{17}{2} = \frac{51}{4} = 12\frac{3}{4}$

(i) $6\frac{1}{2} \times 4\frac{1}{2} = \frac{13}{2} \times \frac{9}{2} = \frac{117}{4} = 29\frac{1}{4}$

3. Total number of students = 50

(a) Number of students who played basketball $= 50 - \left[\frac{2}{3} \times 50 + \frac{3}{5} \times 50\right] = 50 - [20 + 30] = 0$

$\therefore$ No students like basketball

(b) Number of students who played football $= \frac{2}{5}$ of 50

$= \frac{2}{\cancel{5}_{1}} \times \cancel{50}^{10} = 20$ students

(c) Number of students who played cricket $= \frac{3}{5}$ of 50

$= \frac{3}{\cancel{5}_{1}} \times \cancel{50}^{10} = 30$ students

4. Length of park = 35m

Breadth of park = $16\frac{3}{4}$ m $= \frac{67}{4}$ m

Area of park $= L \times B$

$= 35 \times \frac{67}{4} = \frac{2345}{4} = 586\frac{1}{4}$ m

Perimeter of park $= 2(L + B) = 2\left(35 + \frac{67}{4}\right)$

$= 2\left(\frac{140 + 67}{4}\right) = \cancel{2}^{1} \times \frac{207}{\cancel{4}_{2}} = \frac{207}{2} = 103\frac{1}{2}$ m

5. In 1 hour, a car can cover distance $= 65\frac{3}{4}$ km $= \frac{263}{4}$ km

In $2\frac{2}{5}$ hr , a car can cover distance $= \frac{263}{\cancel{4}} \times \frac{\cancel{12}^{3}}{5} = \frac{789}{5} = 157\frac{4}{5}$ km

EXERCISE-2.4

1. (a) The reciprocal of $\frac{3}{7} = \frac{7}{3}$

(b) The reciprocal of $\frac{13}{9} = \frac{9}{13}$

(c) The reciprocal of $\frac{18}{36} = \frac{36}{18}$

(d) The reciprocal of $18 = \frac{1}{18}$

2. (a) $4\frac{2}{5} \div \frac{2}{5} = \frac{\cancel{22}^{11}}{\cancel{5}_{1}} \times \frac{\cancel{5}^{1}}{\cancel{2}_{1}} = 11$

(b) $7 \div \frac{1}{5} = \frac{7}{1} \times \frac{5}{1} = 35$

(c) $6 \div \frac{6}{5} = \frac{\cancel{6}^{1}}{1} \times \frac{5}{\cancel{6}_{1}} = 5$

(d) $\frac{1}{3} \div 2 = \frac{1}{3} \times \frac{1}{2} = \frac{1}{6}$

(e) $\frac{5}{13} \div \frac{1}{5} = \frac{5}{13} \times \frac{5}{1} = \frac{25}{13} = 1\frac{12}{13}$

(f) $\frac{1}{2} \div \frac{4}{7} = \frac{1}{2} \times \frac{7}{4} = \frac{7}{8}$

3. (a) $6 \div 2 = 3$ and $6 \times \frac{1}{2} = 3$

(b) $5 \div \frac{1}{5} = 25$ and $5 \times 5 = 25$

(c) $10 \div \frac{1}{2} = 20$ and $5 \times 4 = 20$

(d) $7 \div \frac{7}{5} = 5$ and $7 \times \frac{5}{7} = 5$

(e) $\frac{1}{5} \div \frac{1}{6} = \frac{6}{5}$ and $\frac{1}{5} \times 6 = \frac{6}{5}$

(f) $12 \div \frac{1}{4} = 48$ and $12 \times 4 = 48$

4. (a) $\frac{2}{3} \div \frac{1}{5} = \frac{2}{3} \times \frac{5}{1} = \frac{10}{3} = 3\frac{1}{3}$

(b) $\frac{3}{5} \div \frac{35}{10} = \frac{3}{\cancel{5}_{1}} \times \frac{\cancel{10}^{2}}{35} = \frac{6}{35}$

(c) $\frac{15}{8} \div \frac{5}{9} = \frac{\cancel{15}^{3}}{8} \times \frac{9}{\cancel{5}_{1}} = \frac{27}{8} = 3\frac{3}{8}$

(d) $\frac{2}{7} \div \frac{1}{11} = \frac{2}{7} \times \frac{11}{1} = \frac{22}{7} = 3\frac{1}{7}$

(e) $\frac{9}{11} \div \frac{5}{11} = \frac{9}{\cancel{11}_{1}} \times \frac{\cancel{11}^{1}}{5} = \frac{9}{5} = 1\frac{4}{5}$

(f) $\frac{5}{7} \div \frac{2}{7} = \frac{5}{\cancel{7}_{1}} \times \frac{\cancel{7}^{1}}{2} = \frac{5}{2} = 2\frac{1}{2}$

(g) $\frac{7}{9} \div \frac{5}{9} = \frac{7}{\cancel{9}} \times \frac{\cancel{9}}{5} = \frac{7}{5} = 1\frac{2}{5}$

(h) $\frac{7}{8} \div \frac{2}{7} = \frac{7}{8} \times \frac{7}{2} = \frac{49}{16} = 3\frac{1}{16}$

(i) $\frac{4}{7} \div \frac{8}{11} = \frac{\cancel{4}^{1}}{7} \times \frac{11}{\cancel{8}_{2}} = \frac{11}{14}$

(j) $\frac{12}{15} \div \frac{3}{13} = \frac{\cancel{12}^{4}}{15} \times \frac{13}{\cancel{3}_{1}} = \frac{52}{15} = 3\frac{7}{15}$

5. The cost of $5\frac{1}{2}$ kg $\left(\frac{11}{2} \text{ kg}\right)$ of sugar $= ₹\ 206\frac{1}{4} = ₹\ \frac{825}{4}$

The cost of 1kg of sugar $= ₹\ \frac{825}{4} \div \frac{11}{2} = \frac{\cancel{825}^{75}}{\cancel{4}_{2}} \times \frac{\cancel{2}^{1}}{\cancel{11}_{1}} = ₹\ \frac{75}{2}$

The cost of $8\frac{1}{4}$ kg $\left(\frac{33}{4} \text{ kg}\right)$ of sugar $= \frac{75}{2} \times \frac{33}{4} = ₹\ \frac{2475}{8} = ₹\ 309\frac{3}{8}$

6. Speed of car = $57\frac{3}{2}$ km/h $= \frac{117}{2}$ km/h

Time taken for travelling by the car = 3 hr 20 min

$$= 200 \text{ min} = \frac{\cancel{20}^{10}\ \cancel{0}}{\cancel{6}_{3}\ \cancel{0}} \text{ hrs} = \frac{10}{3} \text{ hrs}$$

Distance covered by the car $= S \times T = \frac{117}{4} \times \frac{10}{3}$

$$= \frac{\cancel{117}^{39}}{\cancel{4}_{2}} \times \frac{\cancel{10}^{5}}{\cancel{3}}$$

$$= 195 \text{ km}$$

EXERCISE-2.5

1. (a) $26.35 \boxed{>} 22.35$ (b) $23.01 \boxed{=} 23.010$

(c) $369.199 \boxed{<} 369.2$ (d) $014.20 \boxed{>} 4.200$

(e) $0.3 \boxed{>} 0.03$ (f) $87.89 \boxed{<} 87.9$

2. (a) $235.010 = 200 + 30 + 5 + \frac{1}{100}$ (b) $235.101 = 200 + 30 + 5 + \frac{1}{10} + \frac{1}{1000}$

(c) $3057.203 = 3000 + 50 + 7 + \frac{2}{10} + \frac{3}{1000}$

3. (a) $0.025 = \frac{\overset{1}{\cancel{25}}}{\underset{40}{\cancel{1000}}} = \frac{1}{40}$ (b) $0.36 = \frac{\overset{9}{\cancel{18}}\cancel{36}}{\underset{25}{\cancel{50}}\cancel{100}} = \frac{9}{25}$

(c) $10.08 = \frac{10.08}{100} = \frac{\overset{252}{\cancel{504}}\cancel{1008}}{\underset{25}{\cancel{50}}\cancel{100}} = \frac{252}{25} = 10\frac{2}{25}$ (d) $1.15 = \frac{\overset{23}{\cancel{115}}}{\underset{20}{\cancel{100}}} = \frac{23}{20} = 1\frac{3}{20}$

(e) $2.30 = \frac{23\cancel{0}}{10\cancel{0}} = \frac{23}{10} = 2\frac{3}{10}$

4. (a)
$$\begin{array}{r} 12.361 \\ 386.900 \\ +\ 2045.874 \\ \hline 2445.135 \end{array}$$

(b)
$$\begin{array}{r} 564.187 \\ 65.790 \\ +\ 902.231 \\ \hline 1532.208 \end{array}$$

5. (a)
$$\begin{array}{r} 401.00 \\ -\ 205.39 \\ \hline 195.61 \end{array}$$

(b)
$$\begin{array}{r} 250.00 \\ -\ 119.70 \\ \hline 130.30 \end{array}$$

(c)
$$\begin{array}{r} 512.012 \\ -\ 421.611 \\ \hline 90.401 \end{array}$$

6. Ronit new weighs after losing = 55.6 kg

Losing weighs = 8.5 kg

His originally weight was =
$$\begin{array}{r} 55.6\ \text{kg} \\ +\ 8.5\ \text{kg} \\ \hline 64.1\ \text{kg} \end{array}$$

7. Sum of 23.12 and 19.015
$$\begin{array}{r} 23.12 \\ +\ 19.015 \\ \hline 42.135 \end{array}$$

Difference of 23.12 and 19.015

$$\begin{array}{r} 23.120 \\ -19.015 \\ \hline 4.105 \end{array}$$

Difference between their sum and difference

$$\begin{array}{r} 42.135 \\ -\ 4.105 \\ \hline 38.030 \end{array}$$

EXERCISE-2.6

1. (a) $45.25 \times 10 = \frac{4525}{10\cancel{0}} \times 1\cancel{0} = 452.5$

(b) $27.6 \times 10 = \frac{\cancel{276}}{\cancel{10}} \times \cancel{10} = 27$

(c) $3.5 \times 100 = \frac{35}{1\cancel{0}} \times 10\cancel{0} = 350$

(d) $0.0009 \times 100 = \frac{9}{100\cancel{0}\cancel{0}} \times 1\cancel{0}\cancel{0} = 0.09$

(e) $0.0007 \times 1000 = \frac{7}{10\cancel{000}} \times 10\cancel{00} = 0.7$

(f) $0.05 \times 1000 = \frac{5}{1\cancel{00}} \times 10\cancel{00} = 50$

(g) $2.684 \times 10 = \frac{2684}{100\cancel{0}} \times 1\cancel{0} = 26.84$

(h) $6.396 \times 100 = \frac{6396}{1\cancel{000}} \times \cancel{100} = 639.6$

(i) $2.598 \times 10 = \frac{2598}{100\cancel{0}} \times 1\cancel{0} = 25.98$

(j) $0.4 \times 100 = \frac{4}{1\cancel{0}} \times 10\cancel{0} = 40$

(k) $5.4 \times 1000 = \frac{54}{1\cancel{0}} \times 100\cancel{0} = 5400$

(l) $5.92 \times 100 = \frac{592}{\cancel{100}} \times \cancel{100} = 592$

2. (a) $\frac{2.7 \times 6}{10}$ $\frac{\overset{81}{\cancel{162}}}{\cancel{10}} = \frac{81}{5} = 16\frac{1}{5}$

(b) $9.15 \times 42 = \frac{\cancel{915}^{183}}{\cancel{100}_{50}_{10}} \times \cancel{42}^{21} = \frac{3843}{10} = 384\frac{3}{10}$

(c) $0.14 \times 5 = \frac{\cancel{14}^{7}}{\cancel{100}_{20}_{10}} \times \cancel{5} = \frac{7}{10}$

(d) $3.58 \times 20 = \frac{3.58}{\cancel{10}\,\cancel{0}_{5}} \times \cancel{2}^{1}\,\cancel{0} = 71\frac{3}{5}$

(e) $25.3 \times 21 = \frac{253}{10} \times 21 = \frac{5313}{10} = 531\frac{3}{10}$

(f) $17.2 \times 4 = \frac{172}{10} \times 4 = \frac{\cancel{688}^{344}}{\cancel{10}_{5}} = 68\frac{4}{5}$

(g) $0.008 \times 19 = \frac{\cancel{8}^{\cancel{4}^{\cancel{2}^{1}}}}{\cancel{1000}_{\cancel{500}_{\cancel{250}_{125}}}} \times 19 = \frac{19}{125}$

(h) $0.003 \times 2 = \frac{3}{\cancel{1000}_{500}} \times \cancel{2} = \frac{3}{500}$

3. (a)
$$\begin{array}{r} 4.2 \\ +\ 3.6 \\ \hline 7.8 \\ \hline \end{array}$$

(b)
$$\begin{array}{r} 0.400 \\ +\ 0.003 \\ \hline 0.403 \\ \hline \end{array}$$

(c)
$$\begin{array}{r} 3.2 \\ +\ 0.6 \\ \hline 3.8 \\ \hline \end{array}$$

(d)
$$\begin{array}{r} 14.50 \\ +\ 0.15 \\ \hline 14.65 \\ \hline \end{array}$$

(e)
$$\begin{array}{r} 7.2 \\ 0.2 \\ +\ 0.1 \\ \hline 7.5 \\ \hline \end{array}$$

(f)
$$\begin{array}{r} 10.1 \\ 1.1 \\ +\ 0.1 \\ \hline 11.3 \\ \hline \end{array}$$

(g)
$$\begin{array}{r} 2.50 \\ 1.20 \\ +\ 0.01 \\ \hline 3.71 \\ \hline \end{array}$$

(h)
$$\begin{array}{r} 4.2 \\ 100.1 \\ +\ 2.5 \\ \hline 106.8 \\ \hline \end{array}$$

(i) $\begin{array}{r} 1.375 \\ +\ 5.200 \\ \hline 6.575 \end{array}$

4. The cost of 1 kg apples = ₹ 95.50
The cost of 0.8 kg apples = ₹ 95.50 × 0.8
= ₹ 76.400

5. Length of 1 pencil = 12.83 cm
Length of 12 pencils = 12.83 × 12 = 153.96 cm

$\begin{array}{r} 12.83 \\ \times\ \ 12 \\ \hline 2566 \\ 1283\ \times \\ \hline 153.96 \end{array}$

6. Length = 5.7 cm, Breadth = 3.5 cm
Area of rectangle = L × B
= 5.7 × 3.5 = 19.95 cm^2

$\begin{array}{r} 5.7 \\ \times\ 3.5 \\ \hline 285 \\ 171\ \times \\ \hline 19.95 \end{array}$

EXERCISE-2.7

1. (a) $148.29 \div 10 = \frac{14829}{100} \div \frac{10}{1}$

$= \frac{14829}{100} \times \frac{1}{10} = \frac{14829}{1000} = 14.829$

(b) $8.24 \div 100 = \frac{824}{100} \div 100 = \frac{824}{100} \times \frac{1}{100} = \frac{824}{10000} = 0.0824$

(c) $0.526 \div 1000 = \frac{526}{1000} \times \frac{1}{1000} = \frac{526}{1000000} = 0.000526$

(d) $412.47 \div 100 = \frac{41247}{100} \times \frac{1}{100} = \frac{41247}{10000} = 4.1247$

(e) $0.78 \div 10 = \frac{78}{100} \times \frac{1}{10} = 0.078$

(f) $1.679 \div 100 = \frac{1679}{1000} \times \frac{1}{100} = \frac{1679}{100000} = 0.01679$

(g) $0.854 \div 1000 = \frac{854}{1000} \times \frac{1}{1000} = 0.000854$

(h) $0.007 \div 100 = \frac{7}{1000} \times \frac{1}{100} = 0.00007$

(i) $18.408 \div 100 = \frac{18408}{1000} \times \frac{1}{100} = \frac{18408}{100000} = 0.18408$

(j) $108.5 \div 10 = \frac{1085}{10} \times \frac{1}{10} = \frac{1085}{100} = 10.85$

(k) $305.8 \div 1000 = \frac{3058}{10} \times \frac{1}{1000} = 0.3058$

(l) $27.8 \div 10 = \frac{278}{10} \times \frac{1}{10} = 2.78$

2. (a) $8.9 \div 3 = \frac{89}{10} \times \frac{1}{3} = 2.97$

(b) $40.05 \div 8 = \frac{4005}{100} \times \frac{1}{8} = 5.00625$

(c) $7 \div 15 = \frac{7}{1} \times \frac{1}{15} = 0.466..... = 0.47$

(d) $1.56 \div 1.5 = \frac{1.56}{1.5} = \frac{\overset{52}{\cancel{156}}}{10\cancel{0}} \times \frac{1\cancel{0}}{\underset{5}{\cancel{15}}} = \frac{52}{5} \times \frac{1}{10} = 10.4 \times \frac{1}{10} = 1.04$

(e) $11.13 \div 4.1 = \frac{11.13}{100} \div \frac{41}{10} = \frac{1113}{10\cancel{0}} \times \frac{1\cancel{0}}{41} = 27.14634 \times \frac{1}{10} = 2.714634$

(f) $12.42 \div 2.4 = \frac{1242}{100} \div \frac{24}{10} = \frac{\overset{207}{\cancel{621}}}{10\cancel{0}} \times \frac{1\cancel{0}}{\underset{4}{\cancel{12}}} = \frac{207}{4} \times \frac{1}{10} = 51.75 \times \frac{1}{10} = 5.175$

(g) $22.95 \div 6.5 = \frac{2295}{100} \div \frac{65}{10} = \frac{\overset{459}{\cancel{2295}}}{10\cancel{0}} \times \frac{1\cancel{0}}{\underset{13}{\cancel{65}}} = \frac{35.51}{10} = 3.531$

(h) $37.96 \div 7.2 = \frac{\overset{949}{\cancel{1898}}}{10\cancel{0}} \times \frac{1\cancel{0}}{\underset{18}{\cancel{36}}} = \frac{52.72}{10} = 5.272$

3. Perimeter of a polygon = 24.5 cm

Length of each side = 3.5 cm

$$\text{Number of sides} = \frac{\text{Perimeter of polygon}}{\text{Length of each side}}$$

$$= \frac{\overset{7}{\cancel{49}}}{\underset{1}{\cancel{7}}} \times \frac{\cancel{10}}{\cancel{10}} = 7$$

4. Total length of cloth = 40.5 m
Length of cloth for 1 dress = 2.25 m

Number of dresses = $\frac{\cancel{40.5}^{\cancel{81}^{9}}}{\cancel{2.25}_{\cancel{45}^{\cancel{5}_{1}}}} \times \frac{\cancel{10}^{2}\cancel{0}}{\cancel{10}} = 18$ dresses

5. He run in 1 hr = 10.3 km
He run in 3.5 hr = $10.3 \times 3.5 = 36.05$ km

6. A two wheeler covers a distance of 42.5 km in 2.5 hrs

Average speed of the two-wheeler = $\frac{42.5 \times \cancel{10}}{2.5 \times \cancel{10}} = 17$ km

NCERT CORNER

EXERCISE-2.1

1. (a) $2 - \frac{3}{5} = \frac{10-3}{5} = \frac{7}{5}$

(b) $4 + \frac{7}{8} = \frac{32+7}{8} = \frac{39}{8} = 4\frac{7}{8}$

(c) $\frac{3}{5} + \frac{2}{7} = \frac{21+10}{35} = \frac{31}{35}$

(d) $\frac{9}{11} - \frac{4}{15} = \frac{135-44}{165} = \frac{91}{165}$

(e) $\frac{7}{10} + \frac{2}{5} + \frac{3}{2} = \frac{7+4+15}{10} = \frac{\cancel{26}^{13}}{\cancel{10}_{5}} = 2\frac{3}{5}$

(f) $2\frac{2}{3} + 3\frac{1}{2} = \frac{8}{3} + \frac{7}{2} = \frac{16+21}{6} = \frac{37}{6} = 6\frac{1}{6}$

(g) $8\frac{1}{2} - 3\frac{5}{8} = \frac{17}{2} - \frac{29}{8} = \frac{68-29}{8} = \frac{39}{8} = 4\frac{7}{8}$

2. (a) $\frac{2}{9}, \frac{2}{3}, \frac{8}{21}$

LCM of 3,9 and 21 = 63

$\frac{2 \times 7}{9 \times 7} = \frac{14}{63}, \frac{2 \times 21}{3 \times 21} = \frac{42}{63}$

$\frac{8 \times 3}{21 \times 3} = \frac{24}{63}$

Arrange in descending order

$\frac{42}{63} > \frac{24}{63} > \frac{14}{63}$

$\therefore \frac{2}{3} > \frac{8}{21} > \frac{2}{9}$

(b) $\frac{1}{5}, \frac{3}{7}, \frac{7}{10}$

LCM of $5, 7$ and $10 = 70$

$\frac{1 \times 14}{5 \times 14} = \frac{14}{70}, \frac{3 \times 10}{7 \times 10} = \frac{30}{70}, \frac{7 \times 7}{10 \times 7} = \frac{49}{70}$

Arrange in descending order

$\frac{49}{70} > \frac{30}{70} > \frac{14}{70}$

$\therefore \frac{7}{10} > \frac{3}{7} > \frac{1}{5}$

3. Along the first row, sum = $\frac{4}{11} + \frac{9}{11} + \frac{2}{11} = \frac{15}{11}$

Along the second row, sum = $\frac{3}{11} + \frac{5}{11} + \frac{7}{11} = \frac{15}{11}$

Along the third row = $\frac{8}{11} + \frac{1}{11} + \frac{6}{11} = \frac{15}{11}$

Along the first column = $\frac{4}{11} + \frac{3}{11} + \frac{8}{11} = \frac{15}{11}$

Along the second column = $\frac{9}{11} + \frac{5}{11} + \frac{1}{11} = \frac{15}{11}$

Along the third column, sum = $\frac{2}{11} + \frac{7}{11} + \frac{6}{11} = \frac{15}{11}$

Along the first diagonal, sum = $\frac{4}{11} + \frac{5}{11} + \frac{6}{11} = \frac{15}{11}$

Along the second diagonal, sum = $\frac{2}{11} + \frac{5}{11} + \frac{8}{11} = \frac{15}{11}$

Since, the sum of the number's in each row, in each column and along the diagonals is the same, it is a magic square.

4. Length = $12\frac{1}{2}$ cm $= \frac{25}{2}$ cm

Breadth = $10\frac{2}{3}$ cm $= \frac{32}{3}$ cm

Perimeter $= 2(L + B)$

$= 2\left(\frac{25}{2} + \frac{32}{3}\right)$ cm

$= \cancel{2}^{1}\left(\frac{75 + 64}{\cancel{6}_{3}}\right)$

$= \frac{1}{3}(139) = 46\frac{1}{3}$ cm

5. (i) Perimeter of Δ ABE = AB + BE + EA

$= \left(\frac{5}{2} + 2\frac{3}{4} + 3\frac{3}{5}\right)$ cm $= \frac{5}{2} + \frac{11}{4} + \frac{18}{5}$

$= \frac{50 + 55 + 72}{20} = \frac{177}{20} = 8\frac{17}{20}$ cm

(ii) Perimeter of rectangle BCDE $= 2\left(\frac{7}{6} + 2\frac{3}{4}\right)$ cm $= 2\left(\frac{7}{6} + \frac{11}{4}\right)$

$= 2\left(\frac{14 + 33}{12}\right) = \cancel{2}^{1}\left(\frac{47}{\cancel{12}_{6}}\right) = 7\frac{5}{6}$ cm

$\therefore \frac{177}{20} > \frac{47}{6}$

$\therefore$ Perimeter (Δ ABE) > Perimeter (BCDE)

6. Width of picture = $7\frac{3}{5}$ cm $= \frac{38}{5}$ cm

Required width = $7\frac{3}{10}$ cm $= \frac{73}{10}$ cm

The picture should be trimmed by $\left(\frac{38}{5} - \frac{73}{10}\right)$ cm $= \left(\frac{76 - 73}{10}\right) = \frac{3}{10}$ cm

7. Part of apple eaten by Ritu = $\frac{3}{5}$

Part of apple eaten by Somu = 1 – part of apple eaten by Ritu = $1 - \frac{3}{5} = \frac{2}{5}$

$\therefore$ Somu ate $\frac{2}{5}$ part of the apple

Since $\frac{3}{5} > \frac{2}{5}$, Ritu had the larger share

Difference between the 2 shares = $\frac{3}{5} - \frac{2}{5} = \frac{1}{5}$

8. Time taken by Michael = $\frac{7}{12}$ hour

Time taken by Vaibhav = $\frac{3}{4}$ hour

Difference between their time = $\frac{3}{4} - \frac{7}{12} = \frac{9 - 7}{12} = \frac{2}{12} = \frac{1}{6}$ hour

Vaibhav worked longer

EXERCISE-2.2

1. (i) $2 \times \frac{1}{5}$ represents addition of 2 figure, each representing 1 shaded part out of 5 equal parts.

Hence (i) $2 \times \frac{1}{5}$ is represented by (d)

(ii) $2 \times \frac{1}{2}$ represents addition of 2 figure, each representing 1 shaded part out of 2 equal parts.

Hence (ii) $2 \times \frac{1}{2}$ is represented by (b)

(iii) $3 \times \frac{2}{3}$ is represented by (a)

(iv) $3 \times \frac{1}{4}$ is represented by (c)

2. (i) $3 \times \frac{1}{5} = \frac{3}{5}$ is represented by (c)

(ii) $2 \times \frac{1}{3} = \frac{2}{3}$ is represented by (a)

(iii) $3 \times \frac{3}{4} = 2\frac{1}{4}$ is represented by (b)

3. (a) $7 \times \frac{3}{5} = \frac{21}{5} = 4\frac{1}{5}$

(b) $4 \times \frac{1}{3} = \frac{4}{3} = 1\frac{1}{3}$

(c) $2 \times \frac{6}{7} = \frac{12}{7} = 1\frac{5}{7}$

(d) $5 \times \frac{2}{9} = \frac{10}{9} = 1\frac{1}{9}$

(e) $\frac{2}{3} \times 4 = \frac{8}{3} = 2\frac{2}{3}$

(f) $\frac{5}{\cancel{2}_{1}} \times \overset{3}{\cancel{6}} = 15 = 15$

(g) $11 \times \frac{4}{7} = \frac{44}{7} = 6\frac{2}{7}$

(h) $\overset{4}{\cancel{20}} \times \frac{4}{\cancel{5}_{1}} = 16$

(i) $13 \times \frac{1}{3} = \frac{13}{3} = 4\frac{1}{3}$

(j) $\overset{3}{\cancel{15}} \times \frac{3}{\cancel{5}_{1}} = 9$

4. Do it yourself

5. (a) (i) $\frac{1}{2} \times 24 = \frac{24}{2} = 12$

(ii) $\frac{1}{2} \times 46 = \frac{\overset{23}{\cancel{46}}}{\cancel{2}_{1}} = 23$

(b) (i) $\frac{2}{\cancel{3}} \times \overset{6}{\cancel{18}} = 12$

(ii) $\frac{2}{\cancel{3}} \times \overset{9}{\cancel{27}} = 18$

(c) (i) $\frac{3}{\cancel{4}} \times \overset{4}{\cancel{16}} = 12$

(ii) $\frac{3}{\cancel{4}} \times \overset{9}{\cancel{36}} = 27$

(d) (i) $\frac{4}{\cancel{5}_{1}} \times \overset{4}{\cancel{20}} = 16$

(ii) $\frac{4}{\cancel{5}} \times \overset{7}{\cancel{35}} = 28$

6. (a) $3 \times 5\frac{1}{5} = 3 \times \frac{26}{5} = \frac{78}{5} = 15\frac{3}{5}$

(b) $5 \times 6\frac{3}{4} = 5 \times \frac{27}{4} = \frac{135}{4} = 33\frac{3}{4}$

(c) $7 \times 2\frac{1}{4} = 7 \times \frac{9}{4} = \frac{63}{4} = 15\frac{3}{4}$

(d) $4 \times 6\frac{1}{3} = 4 \times \frac{19}{3} = \frac{76}{3} = 25\frac{1}{3}$

(e) $3\frac{1}{4} \times 6 = \frac{13}{\cancel{4}_{2}} \times \cancel{6}^{3} = \frac{39}{2} = 19\frac{1}{2}$

(f) $3\frac{2}{5} \times 8 = \frac{17}{5} \times 8 = \frac{136}{5} = 27\frac{1}{5}$

7. (a) (i) $\frac{1}{2} \times 2\frac{3}{4} = \frac{1}{2} \times \frac{11}{4} = \frac{11}{8} = 1\frac{3}{8}$

(ii) $\frac{1}{2} \times 4\frac{2}{9} = \frac{1}{\cancel{2}} \times \frac{\cancel{38}^{19}}{9} = \frac{19}{9} = 2\frac{1}{9}$

(b) (i) $\frac{5}{8} \times 3\frac{5}{6} = \frac{5}{8} \times \frac{23}{6} = \frac{115}{48} = 2\frac{19}{48}$

(ii) $\frac{5}{8} \times 9\frac{2}{3} = \frac{5}{\cancel{8}} \times \frac{29}{3} = \frac{145}{24} = 6\frac{1}{24}$

8. (i) Water consumed by Vidya $= \frac{2}{5}$ of $5\,l = \frac{2}{\cancel{5}} \times \cancel{5} = 2\,l$

(ii) Water consumed by Pratap $= 1 - \frac{2}{5} = \frac{3}{5}$ of the total water

EXERCISE-2.3

1. (i) (a) $\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$

(b) $\frac{1}{4} \times \frac{3}{5} = \frac{3}{20}$

(c) $\frac{1}{4} \times \frac{4}{3} = \frac{1}{3}$

(ii) (a) $\frac{1}{7} \times \frac{2}{9} = \frac{2}{63}$

(b) $\frac{1}{7} \times \frac{6}{5} = \frac{6}{35}$

(c) $\frac{1}{7} \times \frac{3}{10} = \frac{3}{70}$

2. (a) $\frac{2}{3} \times 2\frac{2}{2} = \frac{2}{3} \times \frac{8}{3} = \frac{16}{9} = 1\frac{7}{9}$

(b) $\frac{2}{\cancel{7}_{1}} \times \frac{\cancel{7}^{1}}{9} = \frac{2}{9}$

(c) $\frac{\cancel{3}}{\cancel{8}_{4}} \times \frac{\cancel{6}^{3}}{4} = \frac{9}{16}$

(d) $\frac{9}{5} \times \frac{3}{5} = \frac{27}{25} = 1\frac{2}{25}$

(e) $\frac{1}{\cancel{3}_{1}} \times \frac{\cancel{15}^{5}}{8} = \frac{5}{8}$

(f) $\frac{11}{2} \times \frac{3}{10} = \frac{33}{20} = 1\frac{13}{20}$

(g) $\frac{4}{5} \times \frac{12}{7} = \frac{48}{35} = 1\frac{13}{35}$

3. (a) $\frac{2}{5} \times 5\frac{1}{4} = \frac{\cancel{2}^{1}}{5} \times \frac{21}{\cancel{4}_{2}} = \frac{21}{10} = 2\frac{1}{10}$

(b) $6\frac{2}{5} \times \frac{7}{9} = \frac{32}{5} \times \frac{7}{9} = \frac{224}{45} = 4\frac{44}{45}$

(c) $\frac{3}{2} \times 5\frac{1}{3} = \frac{\cancel{3}^{1}}{\cancel{2}_{1}} \times \frac{\cancel{16}^{8}}{\cancel{3}} = 8$

(d) $\frac{5}{6} \times 2\frac{3}{7} = \frac{5}{6} \times \frac{17}{7} = \frac{85}{42} = 2\frac{1}{42}$

(e) $3\frac{2}{5} \times \frac{4}{7} = \frac{17}{5} \times \frac{4}{7} = \frac{68}{35} = 1\frac{33}{35}$

(f) $2\frac{3}{5} \times 3 = \frac{13}{5} \times 3 = \frac{39}{5} = 7\frac{4}{5}$

(g) $3\frac{4}{7} \times \frac{3}{5} = \frac{\cancel{25}^{5}}{7} \times \frac{3}{\cancel{5}_{1}} = \frac{15}{7} = 2\frac{1}{7}$

4. (a) $\frac{2}{7}$ of $\frac{3}{4}$ or $\frac{3}{5}$ of $\frac{5}{8}$

$\frac{\cancel{2}^{1}}{7} \times \frac{3}{\cancel{4}_{2}}$ or $\frac{3}{\cancel{5}} \times \frac{\cancel{5}}{8}$

$\frac{3}{14}$ or $\frac{3}{8}$

$\frac{3}{14} \times \frac{4}{4} = \frac{12}{56}$

$\frac{3}{8} \times \frac{7}{7} = \frac{21}{56}$

Since, $\frac{21}{56} > \frac{12}{56}$

$\therefore \frac{3}{8} > \frac{3}{14}$

(b) $\frac{1}{2}$ of $\frac{6}{7}$ or $\frac{2}{3}$ of $\frac{3}{7}$

$\frac{1}{\cancel{2}} \times \frac{\cancel{6}^{3}}{7}$ or $\frac{2}{\cancel{3}_{1}} \times \frac{\cancel{3}^{1}}{7}$

$\frac{3}{7}$ or $\frac{2}{7}$

Since, $\frac{3}{7} > \frac{2}{7}$

5. Gaps between 1st and last sapling = 3

Length of 1 gap = $\frac{3}{4}$ m

$\therefore$ Distance between I and IV sapling = $3 \times \frac{3}{4} = \frac{9}{4} = 2\frac{1}{4}$ m

6. Number of hours Lipika reads the book per day = $1\frac{3}{4} = \frac{7}{4}$ hrs

Number of days = 6

Total number of hours required by her to read the book = $\frac{7}{\cancel{4}} \times \cancel{6}^{3} = \frac{21}{2} = 10\frac{1}{2}$ hrs

7. car can run per litre petrol = 16 km

Quantity of petrol = $2\frac{3}{4}$ l = $\frac{11}{4}$ l

Distance covered by a car can run $\frac{11}{4}$ l petrol = $\frac{11}{4} \times 16 = 44$ km

8. (a) (i) As $\frac{2}{3} \times \boxed{\frac{5}{10}} = \frac{10}{30}$

(ii) The simplest form of $\boxed{\frac{5}{10}}$ is $\boxed{\frac{1}{2}}$

(b) (i) $\frac{3}{5} \times \boxed{\frac{8}{15}} = \frac{24}{75}$

(ii) The simplest form of $\frac{8}{15} = \frac{8}{15}$

EXERCISE-2.4

1. (a) $12 \div \frac{3}{4} = \cancel{12}^{4} \times \frac{4}{\cancel{3}_{1}} = 16$

(b) $14 \div \frac{5}{6} = 14 \times \frac{6}{5} = \frac{84}{5}$

(c) $8 \div \frac{7}{3} = 8 \times \frac{3}{7} = \frac{24}{7}$

(d) $4 \div \frac{8}{3} = \cancel{4}^{1} \times \frac{3}{\cancel{8}_{2}} = \frac{3}{2}$

(e) $3 \div 2\frac{1}{3} = 3 \times \frac{3}{7} = \frac{9}{7}$

(f) $5 \div 3\frac{4}{7} = \cancel{5}^{1} \times \frac{7}{\cancel{25}_{5}} = \frac{7}{5}$

2. (a) $\frac{3}{7} = \frac{7}{3}$, $\therefore$ it is an improper fraction

(b) Reciprocal of $\frac{5}{8} = \frac{8}{5}$, $\therefore$ it is an improper fraction

(c) Reciprocal of $\frac{9}{7} = \frac{7}{9}$, $\therefore$ it is an proper fraction

(d) Reciprocal of $\frac{6}{5} = \frac{5}{6}$, $\therefore$ it is an proper fraction

(e) Reciprocal of $\frac{12}{7} = \frac{7}{12}$, $\therefore$ it is an proper fraction

(f) Reciprocal of $\frac{1}{8} = 8$, $\therefore$ it is an whole number

(g) Reciprocal of $\frac{1}{11} = 11$, $\therefore$ it is an whole number

3. (a) $\frac{7}{3} \div 2 = \frac{7}{3} \times \frac{1}{2} = \frac{7}{6}$

(b) $\frac{4}{9} \div 5 = \frac{4}{9} \times \frac{1}{5} = \frac{4}{45}$

(c) $\frac{6}{13} \div 7 = \frac{6}{13} \times \frac{1}{7} = \frac{6}{91}$

(d) $4\frac{1}{3} \div 3 = \frac{13}{3} \times \frac{1}{3} = \frac{13}{9}$

(e) $3\frac{1}{2} \div 4 = \frac{7}{2} \times \frac{1}{4} = \frac{7}{8}$

(f) $4\frac{3}{7} \div 7 = \frac{31}{7} \times \frac{1}{7} = \frac{31}{49}$

4. (a) $\frac{2}{5} \div \frac{1}{2} = \frac{2}{5} \times \frac{2}{1} = \frac{4}{5}$

(b) $\frac{4}{9} \div \frac{2}{3} = \frac{\cancel{4}^{2}}{\cancel{9}_{3}} \times \frac{\cancel{3}}{\cancel{2}_{1}} = \frac{2}{3}$

(c) $\frac{3}{7} \div \frac{8}{7} = \frac{3}{\cancel{7}_{1}} \times \frac{\cancel{7}^{1}}{8} = \frac{3}{8}$

(d) $2\frac{1}{3} \div \frac{3}{5} = \frac{7}{3} \div \frac{3}{5} = \frac{7}{3} \times \frac{5}{3} = \frac{35}{9}$

(e) $3\frac{1}{2} \div \frac{8}{3} = \frac{7}{2} \div \frac{8}{3} = \frac{7}{2} \times \frac{3}{8} = \frac{21}{16}$

(f) $\frac{2}{5} \div 1\frac{1}{2} = \frac{2}{5} \times \frac{2}{3} = \frac{4}{15}$

(g) $3\frac{1}{5} \div 1\frac{2}{3} = \frac{16}{5} \div \frac{5}{3} = \frac{16}{5} \times \frac{3}{5} = \frac{48}{25}$

(h) $2\frac{1}{5} \div 1\frac{1}{5} = \frac{11}{5} \div \frac{6}{5} = \frac{11}{\cancel{5}_{1}} \times \frac{\cancel{5}^{1}}{6} = \frac{11}{6}$

EXERCISE-2.5

1. (i) 0.5 or 0.05
0.50 > 0.05

(ii) 0.7 or 0.5
0.7 > 0.5

(iii) 7 or 0.7
7.0 > 0.7

(iv) 1.37 or 1.49
1.37 < 1.49

(v) 2.03 or 2.30
2.03 < 2.30

(vi) 0.8 or 0.88
0.80 < 0.88

2. (a) 7 paise $= ₹\frac{7}{100} = ₹\,0.07$

(b) 7 rupees 7 paise $= ₹\,7 + ₹\frac{7}{100} = ₹\,(7 + 0.07) = ₹\,7.07$

(c) 77 rupees 77 paise $= ₹\,77 + ₹\frac{77}{100} = ₹\,(77 + 0.77) = ₹\,77.77$

(d) 50 paise $= ₹\frac{5\cancel{0}}{10\cancel{0}} = ₹\,0.50$

(e) 235 paise $= ₹\frac{235}{100} = ₹\,2.35$

3. (i) $5\text{ cm} = \frac{5}{100}\text{ m} = 0.05\text{ m}$

$5\text{ cm} = \frac{5}{100000} = 0.00005\text{ km}$

(ii) $35\text{ mm} = \frac{35}{10}\text{ cm} = 3.5\text{ cm}$

$35\text{ mm} = \frac{35}{1000} = 0.035\text{ m}$

$35\text{ mm} = \frac{35}{1000000}km = 0.000035km$

4. (a) $200\text{ g} = \frac{200}{1000}\text{ kg} = 0.2\text{ kg}$

(b) $3470\text{ g} = \frac{3470}{1000}\text{ kg} = 3.470\text{ kg}$

(c) $4\text{ kg }8\text{ g} = 4\text{ kg} + \frac{8}{1000}\text{ kg} = (4 + 0.008)\text{ kg}$

5. (a) $20.03 = 20 + 0 + \frac{3}{100} = 2 \times 10 + 0 \times 1 + 0 \times \frac{1}{10} + 3 \times \frac{1}{100}$

(b) $2.03 = 2 \times 1 + 0 \times \frac{1}{10} + 3 \times \frac{1}{100}$

(c) $200.03 = 2 \times 100 + 0 \times 10 + 0 \times 1 + 0 \times \frac{1}{10} + 3 \times \frac{1}{100}$

(d) $2.034 = 2 \times 1 + 0 \times \frac{1}{10} + 3 \times \frac{1}{100} + 4 \times \frac{1}{1000}$

6. (a) 2.56 = Ones
(b) 21.37 = Tens
(c) 10.25 = Tenths
(d) 9.42 = Hundredths
(e) 63.352 = Thousandths

7. Distance travelled by Dinesh = AB + BC
= (7.5 + 12.7) km = 20.2 km
Distance travelled by Ayub = AD + DC
= (9.3 + 11.8) km = 21.1 km
Ayub travelled more distance
Difference = (21.1 – 20.2) km = 0.9 km

8. Total fruits bought by Shyama = 5 kg 300 g + 3kg 250 g
= 8 kg 550 g = 8.550 kg
Total fruits bought by Sarala = 4 kg 800 g + 4 kg 150 g
= 8 kg 950 g = 8.950 kg
∴ Sarala bought more fruits.

9. 42.6 km – 28 km

$$\begin{array}{r} 42.6 \\ -\ 28.0 \\ \hline 14.6 \\ \hline \end{array}$$

EXERCISE-2.6

1. (a) 0.2 × 6 = 1.2
(b) 8 × 4.6 = 36.8
(c) 2.7 × 5 = 13.55
(d) 20.1 × 4 = 80.4
(e) 0.05 × 7 = 0.35
(f) 211.02 × 4 = 844.08
(g) 2 × 0.86 = 1.72

2. Length = 5.7 cm Breadth = 3 cm
Area - L × B = (5.7 × 3) cm^2 = 17.1 cm^2

3. (a) 1.3 × 10 = 13.0 = 13
(b) 36.8 × 10 = 368
(c) 153.7 × 10 = 1537
(d) 168.07 × 10 = 1680.7
(e) 31.1 × 100 = 3110
(f) 156.1 × 100 = 15610
(g) 3.62 × 100 = 362
(h) 43.07 × 100 = 4307
(i) 0.5 × 10 = 5.0
(j) 0.08 × 10 = 0.8
(k) 0.9 × 100 = 90
(l) 0.03 × 1000 = 30

4. Distance covered in 1l of petrol = 55.3 km
Distance covered in 10l of petrol = 55.3 × 10 = 553 km

5. (a) 2.5 × 0.3 = 0.75
(b) 0.1 × 51.7 = 5.17
(c) $0.2 \times 316.8 = \frac{2}{10} \times \frac{3168}{10} = \frac{6336}{100} = 63.36$

(d) $1.3 \times 3.1 = \frac{13}{10} \times \frac{31}{10} = \frac{403}{100} = 4.03$

(e) $0.5 \times 0.05 = \frac{5}{10} \times \frac{5}{100} = \frac{25}{1000} = 0.025$

(f) $11.2 \times 0.15 = \frac{112}{10} \times \frac{15}{100} = 1.68$

(g) $1.07 \times 0.02 = \frac{107}{100} \times \frac{2}{100} = \frac{214}{10000} = 0.0214$

(h) $10.05 \times 1.05 = \frac{1005}{100} \times \frac{105}{100} = \frac{105525}{10000} = 10.5525$

(i) $101.01 \times 0.01 = \frac{10101}{100} \times \frac{1}{100} = \frac{10101}{10000} = 1.0101$

(j) $100.01 \times 1.1 = \frac{10001}{100} \times \frac{11}{10} = \frac{110011}{1000} = 110.011$

EXERCISE-2.7

1. (a) $0.4 \div 2 = \frac{\cancel{4}^{2}}{10} \times \frac{1}{\cancel{2}_{1}} = \frac{2}{10} = 0.2$

(b) $0.35 \div 5 = \frac{\cancel{35}^{7}}{100} \times \frac{1}{\cancel{5}_{1}} = 0.07$

(c) $2.48 \div 4 = \frac{\cancel{2.48}^{62}}{100} \times \frac{1}{\cancel{4}_{1}} = \frac{62}{100} = 0.62$

(d) $65.4 \div 6 = \frac{\cancel{654}^{109}}{10} \times \frac{1}{\cancel{6}_{1}} = \frac{109}{10} = 10.9$

(e) $651.2 \div 4 = \frac{\cancel{6512}^{1628}}{10} \times \frac{1}{\cancel{4}_{1}} = \frac{1628}{10} = 162.8$

(f) $14.49 \div 7 = \frac{\cancel{1449}^{207}}{100} \times \frac{1}{\cancel{7}_{1}} = \frac{207}{100} = 2.07$

(g) $3.96 \div 4 = \frac{\cancel{396}^{99}}{100} \times \frac{1}{\cancel{4}_{1}} = \frac{99}{100} = 0.99$

(h) $0.80 \div 5 = \frac{\cancel{80}^{16}}{100} \times \frac{1}{\cancel{5}_{1}} = \frac{16}{100} = 0.16$

2. (a) $4.8 \div 10 = 0.48$
(b) $52.5 \div 10 = 5.25$
(c) $0.7 \div 10 = 0.07$
(d) $33.1 \div 10 = 3.31$
(e) $272.23 \div 10 = 27.223$
(f) $0.56 \div 10 = 0.056$
(g) $3.97 \div 10 = 0.397$

3. (a) $2.7 \div 100 = 0.027$
(b) $0.3 \div 100 = 0.003$
(c) $0.78 \div 100 = 0.0078$
(d) $432.6 \div 100 = 4.326$
(e) $23.6 \div 100 = 0.236$
(f) $98.53 \div 100 = 0.9853$

4. (a) $7.9 \div 1000 = 0.0079$
(b) $26.3 \div 1000 = 0.0263$
(c) $38.53 \div 1000 = 0.3853$
(d) $128.9 \div 1000 = 0.1289$
(e) $0.5 \div 1000 = 0.0005$

5. (a) $7 \div 3.5 = \overset{1}{\cancel{7}} \times \frac{\overset{2}{\cancel{10}}}{\underset{1}{\cancel{35}}} = 2$

(b) $36 \div 0.2 = \overset{18}{\cancel{36}} \times \frac{10}{\underset{1}{\cancel{2}}} = 180$

(c) $3.25 \div 0.5 = \frac{\overset{65}{\cancel{325}}}{10\cancel{0}} \times \frac{1\cancel{0}}{\underset{1}{\cancel{5}}} = \frac{65\cancel{0}}{10\cancel{0}} = 6.5$

(d) $30.94 \div 0.7 = \frac{\overset{442}{\cancel{3094}}}{10\cancel{0}} \times \frac{1\cancel{0}}{\underset{1}{\cancel{7}}} = \frac{442}{10} = 44.2$

(e) $0.5 \div 0.25 = \frac{\overset{1}{\cancel{05}}}{\cancel{10}} \times \frac{\overset{2}{\cancel{10}\,\cancel{0}}}{\underset{1}{\cancel{25}}} = 2$

(f) $7.75 \div 0.25 = \frac{\overset{31}{\cancel{775}}}{\cancel{100}} \times \frac{\cancel{100}}{\underset{1}{\cancel{25}}} = 31$

(g) $76.5 \div 0.15 = \frac{\overset{51}{\cancel{765}}}{1\cancel{0}} \times \frac{10\cancel{0}}{\underset{1}{\cancel{15}}} = 510$

(h) $37.8 \div 1.4 = \frac{\overset{27}{\cancel{378}}}{\cancel{10}} \times \frac{\cancel{10}}{\underset{1}{\cancel{14}}} = 27$

(i) $2.73 \div 1.3 = \frac{\overset{21}{\cancel{273}}}{10\cancel{0}} \times \frac{1\cancel{0}}{\underset{1}{\cancel{13}}} = \frac{21}{10} = 2.1$

6. Distance covered in 2.4l of petrol = 43.2 km

Distance covered in 1l of petrol = $\frac{432}{10} \div \frac{24}{10} = \frac{\overset{18}{\cancel{432}}}{\cancel{10}} \times \frac{\cancel{10}}{\underset{1}{\cancel{24}}} = 18$ km

SUBJECT ENRICHMENT EXERCISE

I. (1) $\frac{8}{100}$ (2) 304.6

(3) 3.2 (4) 0.06

(5) 0.00085 (6) 15.037

(7) $1\frac{4}{27}$ (8) One tenth

(9) 6 hundredths (10) 16

II. (1) 3240 (2) 3220

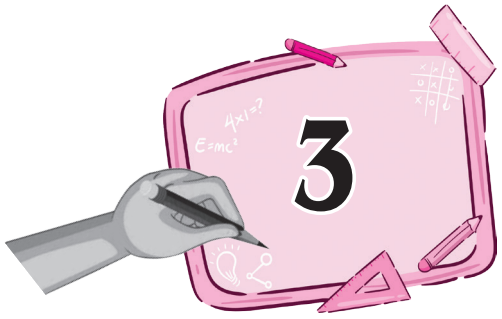
(3) 689 (4) 0

(5) 0.24 (6) 60

(7) 100 (8) $\frac{14}{30}$

III. (1) False (2) False

(3) False (4) True



Data Handling

EXERCISE-3.1

1. Mean = $\frac{\text{Sum of all the observation}}{\text{Number of observation}}$

$8 = \frac{6 + 4 + 7 + P + 10}{5}$

$8 \times 5 = 27 + P$

$40 - 27 = P$

$P = 13$

2. Mean of 16 number = 8

Sum of 16 observation = $16 \times 8 = 128$

If we add 2 to every number then the sum of new 16 observations = $128 + 16 \times 2$

$= 128 + 32 = 160$

$\therefore$ New mean = $\frac{160}{16} = 10$

3. Average = $\frac{\text{Sum of scores}}{\text{Number of games}}$

(i) $(\text{Avg})_A = \frac{14 + 16 + 10 + 10}{4} = \frac{\overset{25}{\cancel{50}}}{\underset{2}{\cancel{4}}} = 12.5$

$(\text{Avg})_B = \frac{0 + 8 + 6 + 4}{4} = \frac{\overset{9}{\cancel{18}}}{\underset{2}{\cancel{4}}} = 4.5$

$(\text{Avg})_C = \frac{8 + 11 + 13}{3} = \frac{32}{3} = 10.66$

$= 10.66.....$

(ii) As average player of A is the greatest, $\therefore$ Player A is the best performer.

4. (i) Mean $= \frac{35 + 27 + 36 + 30 + 29 + 32 + 33 + 28 + 31 + 38}{10}$

$= \frac{319}{10} = 31.9$

(ii) The minimum weight is 27 kg

(iii) Number of students whose weight is more than mean weight = 5

(iv) Range = Maximum weight – Minimum weight = 38 kg – 27 kg = 11kg

5. Range = 96 – 36 = 60

$$\text{Arithmetic mean} = \frac{36 + 42 + 48 + 54 + 60 + 66 + 72 + 78 + 84 + 90 + 96}{11}$$

$$= \frac{726}{11} = 66$$

6. Mean = 11

Sum of 12 number = Mean × Number of observation = 11 × 12 = 132

7. Mean of 9 number = 10

Sum of 9 number = 10 × 9 = 90

Mean of 10 number = Mean of 9 number = 10

Sum of 10 number = 10 × 10 = 100

So, the required number which is added.

Required number = 100 – 90 = 10

8. Range = Maximum value – Minimum value = 92 – 12 = 80

EXERCISE-3.2

1.

Number	Tally Mark	Frequency
1	𝍸 ||||	9
2	𝍸 𝍸 ||||	14
3	𝍸 ||	7
4	𝍸	5
5	|||	3
6	||	2
Total		40

Mode = 2

2.

Number of goods	Tally Mark	Freqeuncy
0	|||	3
1	𝍸 ||||	9
2	𝍸 ||	7
3	𝍸	5
4	|||	3
5	||	2
6	|	1
Total		30

Mode = 1

3. Arrange data in ascending order

82, 85, 85, 87, 87, 90, 90, 90

$n = 9$ (odd)

$$\text{Median} = \left(\frac{n+1}{2}\right)^{\text{th}} \text{ observation}$$

$$= \left(\frac{9+1}{2}\right)^{\text{th}} \text{ observation} = 5^{\text{th}} \text{ observation}$$

Median = 87

Mode = 87 and 90

Yes, there is more than one mode

4. Arrange in ascending order

8, 8, 8, 10, 10, 10, 11, 11, 12, 12, 12, 12, 15

$n = 13$

(i) $\text{Median} = \left(\frac{13+1}{2}\right)^{\text{th}} \text{ observation} = 7^{\text{th}} \text{ observation} = 11$

Mode = 12

(ii) Only 1 students

5. Arrange data in ascending order

₹ 5000, ₹ 5000, ₹ 8000, ₹ 8000, ₹ 8000, ₹ 9000, ₹ 9000, ₹ 10000

$n = 8$

$$\text{Median} = \frac{\frac{n}{2} \text{ and } \left(\frac{n}{2}+1\right)^{\text{th}} \text{ observation}}{2}$$

$$= \frac{\frac{8^{\text{th}}}{2} + \left(\frac{8}{2}+1\right)^{\text{th}}}{2} \text{ observation}$$

$$= \frac{4^{\text{th}} + 5^{\text{th}}}{2} \text{ observation}$$

$$= \frac{8000 + 8000}{2} = 8000$$

Mode = ₹ 8000

$$\text{Mean} = \frac{5000 + 5000 + 8000 + 8000 + 8000 + 9000 + 9000 + 10000}{8}$$

$$= \frac{62000}{8} = 7750$$

7750
15500
31000
62000
8
4
2
1

Mean is the best measure to represent this data.

6. 11, 12, 14, 18, x + 2, x + 4, 30, 32, 35, 41

$n = 10$ (even)

$$\text{Median} = \frac{\left(\frac{n}{2}\right) + \left(\frac{n}{2}+1\right)^{th} \text{ observation}}{2}$$

$$= \frac{5^{th} + 6^{th} \text{ observation}}{2}$$

$$24 = \frac{x + 2 + x + 4}{2}$$

$24 \times 2 = 2x + 6$

$24 \times 2 - 6 = 2x$

$48 - 6 = 2x$

$42 = 2x$

$x = 21$

7. 25, 27, 28, 31, 35, 36, 38, 40

$n = 8$

$$\text{Median} = \left(\frac{4^{th} + 5^{th}}{2}\right) \text{ observation}$$

$$= \frac{31 + 35}{2} = \frac{\overset{33}{\cancel{66}}}{\cancel{2}} = 33$$

8. Arrange data in ascending order

27, 28, 29, 30, 31, 32, 34, 35, 36, 37, 41, 42, 43, 44, 45

$n = 15$

$$\text{Median} = \left(\frac{15+1}{2}\right)^{th} \text{ observation}$$

$= 8^{th}$ observation

Median = 35

9. 3, 4, 5, 6, 6, 6, 7, 7, 8, 9

Mode = 6

10. 15, 18, 19, 20, 20, 24, 25, 27, 28, 29

Mode = 20

Median = 5^{th} observation + 6^{th} observation

$$= \frac{20 + 24}{2} = \frac{44}{2} = 22$$

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

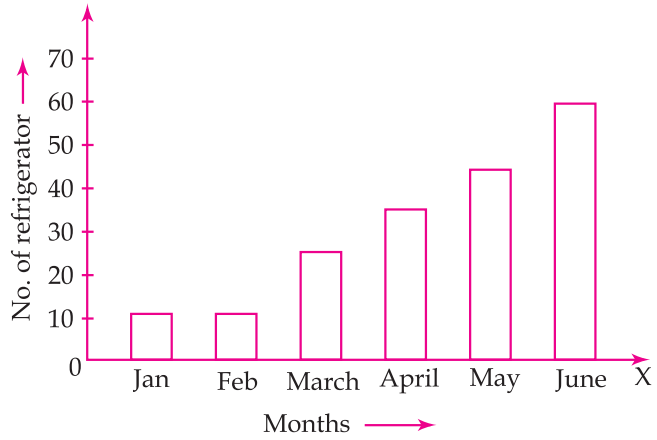
$$\text{Median} = \frac{\left(\frac{n}{2}\right)^{th} + \left(\frac{n}{2}+1\right)^{th} \text{ observation}}{2}$$

$= 5^{th}$ and 6^{th} observation

$$= \frac{11 + 13}{2} = \frac{24}{2} = 12$$

EXERCISE-3.3

1.



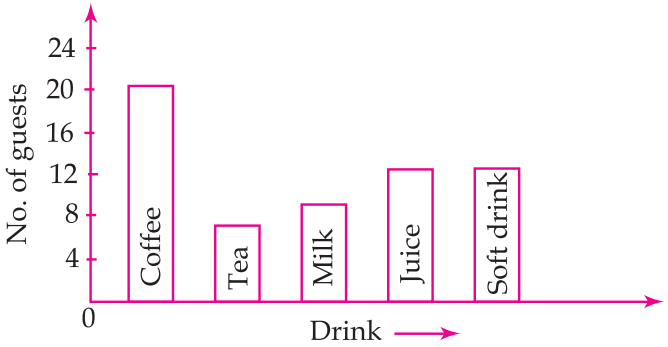
2. (a) The bar graph represent the import and export (in 100 crore of Rs) from 2010 - 11 to 2014 - 2015

(b) In 2010 - 11

(c) In 2014 - 15

(d) In 2010 - 11, the difference between import and export = 25 – 20 = 5
In 2011 - 12, the difference between import and export = 45 – 40 = 5
In 2012 - 13 the difference between import and export = 45 – 30 = 15
In 2013 - 14 the difference between import and export = 50 – 25 = 15
In 2014 - 1 the difference between import and export = 60 – 35 = 25
∴ In 2014 – 15 year is the difference between import and export maximum.

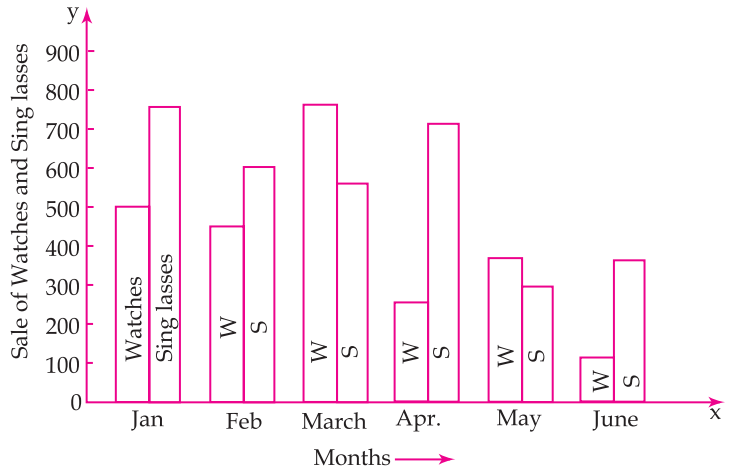
3. (a)



(b) Mode = 20. It tell us about the coffee preferred drinks in a party.

(c) Juice and soft drink are preferred by the same number of guests

4.



(a) In April month was the difference in the sales of watches and sunglasses the maximum.

(b) (1) Ratio of sale of watches to sunglasses in the month of January = $\frac{\overset{2}{\cancel{50}\,\cancel{0}}}{\underset{3}{\cancel{75}\,\cancel{0}}} = \frac{2}{3} = 2 : 3$

(2) Ratio in the month of February = $\frac{\overset{3}{\cancel{15}}\,\cancel{45}\,\cancel{0}}{\underset{4}{\cancel{20}}\,\cancel{60}\,\cancel{0}} = \frac{3}{4} = 3 : 4$

(3) Ratio in the month of March = $\frac{\overset{15}{\cancel{75}\,\cancel{0}}}{\underset{11}{\cancel{55}\,\cancel{0}}} = \frac{15}{11} = 15 : 11$

(4) Ratio in the month of April = $\frac{\overset{5}{\cancel{25}\,\cancel{0}}}{\underset{14}{\cancel{70}\,\cancel{0}}} = 5 : 14$

(5) Ratio in the month of May = $\frac{\overset{14}{\cancel{350}}}{\underset{11}{\cancel{275}}} = \frac{14}{11} = 14 : 11$

(6) Ratio in the month of June = $\frac{\overset{2}{\cancel{10}\,\cancel{0}}}{\underset{7}{\cancel{35}\,\cancel{0}}} = \frac{2}{7} = 2 : 7$

In month of February was the ratio of sale of watches to sunglasses 3 : 4.

EXERCISE-3.4

1. (a) Impossible event
(b) Certain event
(c) Can happen but not certain
(d) Can happen but not certain
(e) Impossible
(f) Certain
(g) Certain
(h) Certain

2. Total card = 52

(a) Probability that drawing an ace = $\frac{\overset{1}{\cancel{4}}}{\underset{13}{\cancel{52}}} = \frac{1}{13}$

(b) Probability of a face card = $\frac{\overset{3}{\cancel{6}}\,\cancel{12}}{\underset{13}{\cancel{26}}\,\cancel{52}} = \frac{3}{13}$

3. Total balls = 12
Red balls = 2
Gold balls = 4
Silver balls = 3
White balls = 3

(a) Probability of a silver ball = $\frac{\cancel{3}^{1}}{\cancel{12}_{4}} = \frac{1}{4}$

(b) Probability of a ball white is not red = $\frac{\cancel{10}^{5}}{\cancel{12}_{6}} = \frac{5}{6}$

4. (a) Probability (getting a letter R) = $\frac{1}{11}$

(b) Probability (getting a letter N) = $\frac{2}{11}$

(c) Probability (getting a letter E) = $\frac{2}{11}$

(d) Probability (getting a vowel) = $\frac{5}{11}$

(e) Probability (getting a cons.) = $\frac{6}{11}$

(f) Probability (getting a letter G) = $\frac{0}{11} = 0$

5. (a) Probability (a number less than 1) = 0

(b) Probability (a multiple of 2) = $\frac{\cancel{4}^{1}}{\cancel{8}_{2}} = \frac{1}{2}$

(c) Probability (a factor of 4) = $\frac{3}{8}$

(d) Probability (an odd factor of 6) = $\frac{\cancel{2}^{1}}{\cancel{8}_{4}} = \frac{1}{4}$

6. Probability of winning a game = 0.4

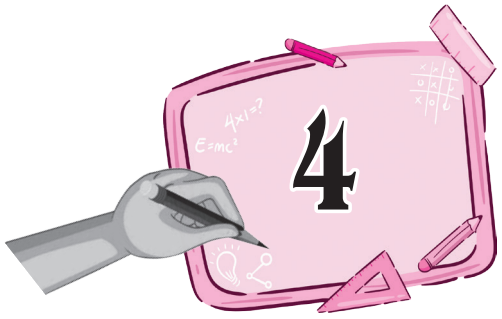
Probability of losing a game = 1 – P (Winning) = 1 – 0.4 = 0.6

SUBJECT ENRICHMENT EXERCISE

I. (1) 48.833 (2) 50
(3) 2 (4) 8421
(5) 2 (6) 20.5
(7) 2 (8) 50

II. (1) 3 (2) 2
(3) 4, even (4) 5, odd
(5) Median

III. (1) False (2) True
(3) True (4) False
(5) False



Simple Equation

EXERCISE-4.1

1. (a) $3x + 5 = 7$

(b) $m \times m - 21 = 4 = m^2 - 21 = 4$

(c) $\frac{x}{3} + 7 = 12$

(d) $m - 2 = 9$

(e) $8p + 1 = 49$

(f) $\frac{x}{3} = -1$

2. (a) $5a + 7b = 43$

(b) $a^2 + b^2 = 61$

(c) $a^2 - b^2 = 13$

(d) $3x = 3 + 2x$

3. (a) $x + 3 = 7 \rightarrow$ The sum of number x and 3 is 7

(b) $m - 4 = 1 \rightarrow$ four subtracted from m gives 1

(c) $2m = 16 \rightarrow$ Two times of a number m is sixteen

(d) $\frac{x}{4} + 3 = 7 \rightarrow$ One-fourth of x plus three is seven.

4. (a) Let the Mohan age = x

Mohan's father's age = $3x$

A.T.Q

Equation = $x + 3x = 64$

(b) Let the Neetu's age = x

Neetu's father age = 61

A.T.Q

Equation = $2x + 1 = 61$

(c) Let apples in small box be x and in larger box be y

So, number of apples in 6 small boxes = $6x$

Larger box containing 3 more apples than the number of apples contained in the 6 boxes of the smaller type.

And larger box contains 75 apples (y) = 75

A.T.Q

$y = 6x + 3$

$75 = 6x + 3$

5. (a) $2x + 3 = 5$; $x = 1$

Put $x = 1$ in equation

$2(1) + 3 = 5$

$2 + 3 = 5$

$5 = 5$

LHS = RHS

$\therefore$ $x = 1$ is a solution of the given equation $2x + 3 = 5$

(b) $3x - 4 = 2$; $x = 2$

Put $x = 2$ in equation

$3(2) - 4 = 2$

$6 - 4 = 2$

$2 = 2$

LHS = RHS

$\therefore$ $x = 2$ is a solution of the given $3x - 4 = 2$

(c) $x + 3 = 0$; $x = 3$

Put $x = 3$ in equation

$3 + 3 = 0$

$6 \neq 0$

LHS $\neq$ RHS

$\therefore$ $x = 3$ is not a solution of the given equation $x + 3 = 0$

(d) $x + 5 = 0$; $x = -5$

Put $x = -5$ in equation

$(-5) + 5 = 0$

$0 = 0$

LHS = RHS

$\therefore$ $x = -5$ is a solution of the given equation $x + 5 = 0$

EXERCISE-4.2

1. (a) $x + 5 = 5$

$x + 5 - 5 = 0$

$x = 0$

(b) $u + 4 = -16$

$u = -16 - 4 = -20$

$u = -20$

(c) $u + 9 = 17$

$u = 17 - 9 = 8$

(d) $p + 20 = 100$

$p = 100 - 20 = 80$

(e) $y - 7 = 3$

$y = 3 + 7 = 10$

(f) $q - 2 = -20$

$q = -20 + 2 = -18$

(g) $x + 19 = 20$

$x = 20 - 19 = 1$

(h) $x + 110 = 100$

$x = 100 - 110 = -10$

(i) $p - 2 = -6$

$p = -6 + 2 = -4$

(j) $p - 60 = -77$

$p = -77 + 60 = -17$

(k) $p + 80 = 100$
$p = 100 - 80 = 20$

(l) $s + 80 = 60$
$s = 60 - 80$
$s = -20$

(m) $x - 9 = 5$
$x = 5 + 9 = 14$

(n) $x - 14 = -31$
$x = -31 + 14$
$x = -17$

(o) $y + 12 = 73$
$y = 73 - 12$
$y = 61$

(p) $x - 5 = 25$
$x = 25 + 5 = 30$

2. (a) $(x - 3) + (x - 2) = 3$
When $x = 4$
$(4 - 3) + (4 - 2) = 3$
$1 + 2 = 3$
$3 = 3$
LHS = RHS
$\therefore$ 4 is the root of $(x - 3) + (x - 2) = 3$

(b) $12x = 84$
Put $x = 7$
$12(7) = 84$
$84 = 84$
LHS = RHS
$\therefore$ 7 is the root of $12x = 84$

(c) $2x - 3 = 9$
Put $x = 6$
$2(6) - (3) = 9$
$12 - 3 = 9$
$9 = 9$
LHS = RHS
$\therefore$ 6 is the root of $2x - 3 = 9$

(d) $x^2 = 9$
When $x = -3$
$(-3)^2 = 9$
$9 = 9$
LHS = RHS
$\therefore$ (-3) is the root of $x^2 = 9$

(e) $2(x + 4) = 0$

$x = -4$
$2(-4 + 4) = 0$
$2(0) = 0$
$0 = 0$
LHS = RHS
$\therefore$ -4 is the root of $2(x + 4) = 0$

(f) $\frac{x+1}{2} + \frac{x+3}{2} = 13$

$x = 11$

$\frac{11+1}{2} + \frac{11+3}{2} = 13$

$6 + 7 = 13$
$13 = 13$
LHS = RHS
$\therefore$ 11 is the root of $\frac{x+1}{2} + \frac{x+3}{2} = 13$

3. (a) $3x + 5 = 17$

$3x = 17 - 5$

$x = \frac{\cancel{12}^{4}}{\cancel{3}} = 4$

(b) $\frac{x+18}{3} = 6$

$x + 18 = 18$

$x = 18 - 18 = 0$

(c) $2t + 9 = 20$
$2t = 20 - 9$

$t = \frac{11}{2}$

(d) $3p - 12 = 15$
$3p = 15 + 12$

$p = \frac{\cancel{27}^{9}}{\cancel{3}} = 9$

(e) $8y + 7 = -23 + 3y$

$8y - 3y = -23 - 7$

$5y = -30$

$y = -6$

(f) $11x - 8 = 41$

$11x = 41 + 8$

$11x = 49$

$x = \frac{49}{11}$

(g) $16x - 3 = -7$

$16x = -7 + 3$

$16x = -4$

$x = \frac{-\cancel{4}^{1}}{\cancel{16}_{4}} = \frac{-1}{4}$

(h) $\frac{y}{10} - 12 = 9$

$\frac{y}{10} = 9 + 12$

$\frac{y}{10} = 21$

$y = 210$

(i) $8p = 6p + 10$

$8p - 6p = 10$

$2p = 10$

$p = 5$

(j) $4y = -2y + 30$

$4y + 2y = 30$

$6y = 30$

$y = \frac{+\cancel{30}^{5}}{\cancel{6}_{1}} = 5$

(k) $-p = 2 + p$

$-p - p = 2$

$-2p = 2$

$p = -1$

(l) $3(y + 1) = 6$

$y + 1 = 2$

$y = 2 - 1 = 1$

(m) $30 = 6\,(8 + x)$

$\frac{30}{6} = 8 + x$

$5 = 8 + x$

$x = 5 - 8$

$x = -3$

(n) $\frac{2t + 3}{7} = 5$

$2t + 3 = 35$

$2t = 35 - 3$

$t = \frac{\cancel{32}^{16}}{\cancel{2}} = 16$

(o) $\frac{x}{3} + 5 = 20$

$\frac{x}{3} = 20 - 5$

$x = 15 \times 3 = 45$

(p) $3(x - 5) = 4$

$3x - 15 = 4$

$3x = 4 + 15$

$3x = 19$

$x = \frac{19}{3}$

EXERCISE-4.3

1. (a) Let the number = x

A.T.Q

$x + 45 = 80 - 5$

$x + 45 = 75$

$x = 75 - 45$

$x = 30$

$\therefore$ The number is 30

(b) Let the another number = x

The first number = $8x$

A.T.Q

$8x - x = 56$

$7x = 56$

$x = \frac{56}{7} = 8$

$\therefore$ The number are 8 and 64

(c) Let the one number = x

The other number = $5x$

A.T.Q

$5x + x = 30$

$6x = 30$

$x = 5$

$\therefore$ The required number = 5 and 25

(d) Let the number x

A.T.Q

$\frac{x}{2} = 2x - 24$

$x = 2(2x - 24)$

$x = 4x - 48$

$x - 4x = -48$

$-3x = -48$

$x = \frac{\cancel{48}^{16}}{\cancel{3}_{1}}$

$\therefore$ The required number is 16

(e) Let the cost of pen = x

The cost of book = $2x$

A.T.Q

$x + 2x = 48$

$3x = 48$

$x = 16$

$\therefore$ The cost of per book is Rs (2×16) = Rs 32

2. (a) Let the number = x

A.T.Q

$\frac{4}{19} \times x = 17$

$x = \frac{17 \times 19}{4} = \frac{323}{4} = 80\frac{3}{4}$

(b) Let the number = x

A.T.Q

$\frac{3}{5}x = 60$

$x = \frac{\cancel{60}^{20} \times 5}{\cancel{3}_{1}} = 100$

(c) Let the number = x

A.T.Q

$$\frac{x}{2} + x = 54$$

$$\frac{3x}{2} = 54$$

$$x = \frac{\overset{18}{\cancel{54}} \times 2}{\underset{1}{\cancel{3}}} = 36$$

(d) Let the number = x

$3x = 690$

$$x = \frac{\overset{230}{\cancel{690}}}{\underset{1}{\cancel{3}}} = 230$$

(e) The cost of five note books = ₹ 90

The cost of 1 note book = ₹ $\frac{\overset{18}{\cancel{90}}}{\underset{1}{\cancel{5}}}$

(f) Let the brother's weigh = x kg

The girls's weight = $\frac{2}{3}x$ kg

A.T.Q

$$x + \frac{2}{3}x = 85$$

$$\frac{3x + 2x}{3} = 85$$

$$5x = 85 \times 3$$

$$x = \frac{\overset{17}{\cancel{85}} \times 3}{\underset{1}{\cancel{5}}} = 51$$

$\therefore$ The weight of the girl $= \frac{2}{3}x$ kg

$$= \frac{2}{\underset{1}{\cancel{3}}} \times \overset{17}{\cancel{51}} = 34 \text{ kg}$$

(g) His income = ₹ x

Nitin spend on food = $\frac{5}{8} \times x = \frac{5}{8}x$

A.T.Q

$$\frac{5x}{8} = 5000$$

$$5x = 5000 \times 8$$

$$x = \frac{\overset{1000}{\cancel{5000}} \times 8}{\underset{1}{\cancel{5}}} = ₹\ 8000$$

$\therefore$ His income is ₹ 8000.

(h) Let the no. = x

A.T.Q

$x + 7 = 100$

$x = 93$

3. (a) Find the number, such that nine times of the number is 3 more than 2.

(b) Find the number, such that 3 times of the number is 27.

(c) Find the number, such that the sum of 4 times a number and 7 is 23.

(d) Five times a number is 2. What is the number?

(e) The sum of a number and 3 is equal to 7. What is the number?

(f) The sum of twice a number and 1 is 7. What is the number?

(g) Five is the different of five times of a number and 10. What is the number?

(h) The difference of 12 and a number is 8. What is the number?

4. Let the number = x

A.T.Q

$x - 64 = 1$

$x = 1 + 64 = 65$

$x = 65$

$\therefore$ The required number = 65

5. Let the number = x

A.T.Q

$$15 + \frac{2}{3}x = 45$$

$$\frac{2}{3}x = 45 - 15$$

$$\frac{2}{3}x = 30$$

$$x = \frac{\overset{15}{\cancel{30}} \times 3}{\underset{1}{\cancel{2}}} = 45$$

$\therefore$ The required number = 45

6. Let the number = x

A.T.Q

$24 - x = 18$

$24 - 18 = x$

$6 = x$

$\therefore$ The required number = x

7. Let the one angle = x

The other angle = $x + 20$

A.T.Q

$x + (x + 20) = 180°$

$2x + 20 = 180°$

$2x = 180° - 20°$

$$x = \frac{\overset{80°}{\cancel{160°}}}{\cancel{2}} = 80°$$

The first angle = 80°

The other angle = $x + 20° = 80° + 20° = 100°$

8. Let the breadth = x m

The length = $3x$ m

Perimeter = 120 m

A.T.Q

$120 = 2(x + 3x)$

$60 = 4x$

$$x = \frac{\overset{15}{\cancel{60}}}{\underset{1}{\cancel{4}}} = 15$$

$\therefore$ The breadth = 15 m

Length = 3(15) = 45 m

9. Let the total number of children in the group = x

Children play football = $\frac{1}{5}$ of $x = \frac{x}{5}$

Children play basketball = $\frac{1}{4}$ of $x = \frac{x}{4}$

Children Play cricket = $\frac{2}{5}$ of $x = \frac{2x}{5}$

Children play other games = 30

A.T.Q

$$\frac{x}{5} + \frac{x}{4} + \frac{2x}{5} + \frac{30}{1} = x$$

$$\frac{4x + 5x + 8x + 600}{20} = x$$

$$\frac{17x + 600}{20} = x$$

$17x + 600 = 20x$

$20x - 17x = 600$

$3x = 600$

$x = 200$

10. Let the number be x

Then, the 3 consecutive even natural number are

$2x, 2x + 2, 2x + 4$

A.T.Q

$2x + 2x + 2 + 2x + 4 = 48$

$6x + 6 = 48$

$$x = \frac{48 - 6}{6} = \frac{\cancel{42}^{7}}{\cancel{6}_{1}} = 7$$

$\therefore$ The three consecutive number are 14, 16, 18

11. Let the number of glass broken = x

Then, number of the glass = $50 - x$

Now,

$3(50 - x) - 2(x) = 90$

$150 - 3x - 2x = 90$

$150 - 5x = 90$

$150 - 90 = 5x$

$60 = 5x$

$x = 12$

$\therefore$ The number of glasses that were broken = 12

NCERT CORNER

EXERCISE-4.1

1. (i) $x \times 3 = 0$

Put $x = 3$

$3 + 3 = 0$

$6 \neq 0$

LHS $\neq$ RHS

No, the equation is not satisfied.

(ii) $x + 3 = 0$

Put $x = 0$

$0 + 3 = 0$

$3 \neq 0$

LHS $\neq$ RHS

No, the equation is not satisfied

(iii) $x + 3 = 0$

Put $x = -3$

$-3 + 3 = 0$

$0 = 0$

LHS = RHS

$\therefore$ Yes, the equation is satisfied

(iv) $x - 7 = 1$

Put $x = 7$

$7 - 7 = 1$

$0 \neq 1$

LHS $\neq$ RHS

No, the equation is not satisfied

(v) $x - 7 = 1$

Put $x = 8$

$8 - 7 = 1$

$1 = 1$

LHS = RHS

Yes, the equation is satisfied

(vi) $5x = 25$

Put $x = 0$

$5(0) = 25$

$0 \neq 25$

LHS $\neq$ RHS

No, the equation is not satisfied

(vii) $5x = 25$

Put $x = 5$

$5(5) = 25$

$25 = 25$

LHS = RHS

Yes, the equation is satisfied

(vii) $5x = 25$

Put $x = -5$

$5(-5) = 25$

$-25 \neq 25$

LHS $\neq$ RHS

No, the equation is not satisfied

(ix) $\frac{m}{3} = 2$

Put $m = -6$

$\frac{-\cancel{6}^{2}}{\cancel{3}} = 2$

$-2 \neq 2$

LHS $\neq$ RHS

No, the equation is not satisfied

(x) $\frac{m}{3} = 2$

Put $m = 0$

$\frac{0}{3} \neq 2$

LHS $\neq$ RHS

No, the equation is not satisfied

(xi) $\frac{m}{3} = 2$

Put m = 6

$\frac{6}{3} = 2$

LHS = RHS

Yes, the equation is satisfied

2. (a) $n + 5 = 19$

Put $n = 1$

$1 + 5 \neq 19$

LHS $\neq$ RHS

$\therefore$ $n = 1$ is not a solution of the given equation.

(b) $7n + 5 = 19$

Put $n = -2$

$7(-2) + 5 = 19$

$-14 + 5 = 19$

$-9 \neq 19$

LHS $\neq$ RHS

$\therefore$ $n = -2$ is not a solution of the given equation.

(c) $7n + 5 = 19$

$n = 2$

$7(2) + 5 = 19$

$19 = 19$

LHS = RHS

$\therefore$ $n = 2$ is a solution of the given equation.

(d) $4p - 3 = 13$

$p = 1$

$4(1) - 3 = 13$

$4 - 3 \neq 13$

LHS $\neq$ RHS

$\therefore$ $p = 1$ is not a solution of the given equation.

(e) $4p - 3 = 13$

$p = -4$

$4(-4) - 3 = 13$

$-16 - 3 = 13$

LHS $\neq$ RHS

$\therefore$ $p = -4$ is not a solution of the given equation.

(f) $4p - 3 = 13$

$p = 0$

$4(0) - 3 = 13$

$0 - 3 \neq 13$

LHS $\neq$ RHS

p = 0 is not a solution of the given equation.

3. (i) $5p + 2 = 17$

Put P = 1

$5(1) + 2 = 17$

$7 \neq 17$

LHS $\neq$ RHS

Put P = 2

$5(2) + 2 = 17$

$12 \neq 17$

LHS $\neq$ RHS

Put P = 3

$5(3) + 2 = 17$

$15 + 2 = 17$

$17 = 17$

LHS = RHS

Hence P = 3 is a solution of the given equation.

(ii) $3m - 14 = 4$

Put $m = 1$

$3(1) - 14 = 4$

$3 - 14 = 4$

$-11 \neq 4$

LHS $\neq$ RHS

Put $m = 5$

$3(5) - 14 = 4$

$15 - 14 = 4$

$1 \neq 4$

LHS ≠ RHS

Put $m = 6$

$3(6) - 14 = 4$

$18 - 14 = 4$

$4 = 4$

LHS = RHS

Hence, $m = 6$ is a solution of the given equation.

4. (a) $x + 4 = 9$ (b) $y - 2 = 8$

(c) $10a = 70$ (d) $\frac{b}{5} = 6$

(e) $\frac{3}{4}t = 15$ (f) $7m + 7 = 77$

(g) $\frac{x}{4} - 4 = 4$ (h) $6y - 6 = 60$

(i) $\frac{z}{3} + 3 = 30$

5. (a) The sum of p and 4 is 15.

(b) 7 subtracted from m is 3.

(c) Twice of a number m is 7.

(d) One-fifth of m is 3.

(e) Three-fifth of m is 6.

(f) Three time of a number p, when added to 4, gives 25.

(g) When 2 is subtracted from four times of a number p, it gives 18.

(h) When 2 is added to half of a number, it gives 8.

6. (i) $5m + 7 = 37$

(ii) Let Laxmi be y year old

$3y + 4 = 49$

(iii) Let the lowest marks be l

A.T.Q

$2l + 7 = 87$

(iv) Let the base angle be b

Vertex angle = 2 × Base angle

= 2 × b = 2b

Sum of all interior angle of a $\Delta = 180°$

$b + b + 2b = 180°$

$4b = 180°$

$4b = 180°$

EXERCISE-4.2

1. (a) $x - 1 = 0$

$x - 1 + 1 = 0 + 1$

$x = 1$

(b) $x + 1 = 0$

$x + 1 - 1 = 0 - 1$

$x = -1$

(c) $x - 1 = 5$

$x - 1 + 1 = 5 + 1$

$x = 6$

(d) $x + 6 = 2$

$x + 6 - 6 = 2 - 6$

$x = -4$

(e) $y - 4 = -7$

$y - 4 + 4 = -7 + 4$

$y = -3$

(f) $y - 4 = 4$

$y - 4 + 4 = 4 + 4$

$y = 8$

(g) $y + 4 = 4$

$y + 4 - 4 = 4 - 4$

$y = 0$

(h) $y + 4 = -4$

$y + 4 - 4 = -4 - 4$

$y = -8$

2. (a) $3l = 42$

$\frac{\cancel{3}\, l}{\cancel{3}} = \frac{\overset{14}{\cancel{42}}}{\cancel{3}}$

$l = 14$

(b) $\frac{b}{2} = 6$

$\frac{b}{\cancel{2}} \times \cancel{2} = 6 \times 2$

$b = 12$

(c) $\frac{P}{7} = 4$

$\cancel{7} \times \frac{b}{\cancel{7}} = 7 \times 4$

$P = 28$

(d) $4x = 25$

$\frac{\cancel{4}(x)}{\cancel{4}} = \frac{25}{4}$

$x = \frac{25}{4}$

(e) $8y = 36$

$\frac{\cancel{8}(y)}{\cancel{8}} = \frac{\overset{9}{\cancel{36}}}{\cancel{8}_{2}}$

$y = \frac{9}{2}$

(f) $\frac{z}{3} = \frac{5}{4}$

$\frac{z}{\cancel{3}} \times \cancel{3} = \frac{5}{4} \times 3$

$z = \frac{15}{4}$

(g) $\frac{a}{5} = \frac{7}{15}$

$\frac{a}{\cancel{5}} \times \cancel{5} = \frac{7}{\cancel{15}_{3}} \times \cancel{5}$

$a = \frac{7}{3}$

(h) $20t = -10$

$\frac{\cancel{20}\, t}{\cancel{20}} = \frac{-10}{20}$

$t = \frac{-1}{2}$

3. (a) $3n - 2 = 46$

$3n = 48$

$n = 16$

(b) $5m + 7 = 17$

$5m = 10$

$m = 2$

(c) $\frac{20p}{3} = 40$

$p = \frac{\overset{2}{\cancel{40}} \times 3}{\cancel{20}_{1}} = 6$

(d) $\frac{3p}{10} = 6$

$p = \frac{\overset{2}{\cancel{6}} \times 10}{\cancel{3}_{1}} = 20$

4. (a) $10p = 100$

$p = 10$

(b) $10p + 10 = 100$

$10p = 90$

$p = 9$

(c) $\frac{p}{4} = 5$

$p = 20$

(d) $\frac{-p}{3} = 5$

$-p = 15$

$p = -15$

(e) $\frac{3p}{4} = 6$

$p = \frac{\overset{2}{\cancel{6}} \times 4}{\underset{1}{\cancel{3}}} = 8$

(f) $3s = -9$

$s = \frac{-\overset{3}{\cancel{9}}}{\cancel{3}} = -3$

$s = -3$

(g) $3s + 12 = 0$

$3s = -12$

$s = \frac{\overset{-4}{\cancel{12}}}{\underset{1}{\cancel{3}}} = -4$

(h) $3s = 0$

$s = 0$

(i) $2q = 6$

$q = 3$

(j) $2q - 6 = 0$

$2q = 6$

$q = 3$

(k) $2q + 6 = 0$

$2q = -6$

$q = -3$

(l) $2q + 6 = 12$

$2q = 12 - 6$

$q = \frac{\overset{3}{\cancel{6}}}{\underset{1}{\cancel{2}}}$

$q = 3$

EXERCISE-4.3

1. (a) $2y = \frac{37}{2} - \frac{5}{2}$

$2y = \frac{\overset{16}{\cancel{32}}}{\cancel{2}}$

$y = \frac{16}{2} = 8$

(b) $5t + 28 = 10$

$5t = 10 - 28$

$5t = -18$

$t = \frac{-18}{5}$

(c) $\frac{a}{5} + 3 = 2$

$\frac{a}{5} = 2 - 3$

$\frac{a}{5} = -1$

$a = -5$

(d) $\frac{q}{4} + 7 = 5$

$\frac{q}{4} = 5 - 7$

$\frac{q}{4} = -2$

$q = -8$

(e) $\frac{5}{2}x = -5$

$x = \frac{-\cancel{5} \times 2}{\cancel{5}} = -2$

(f) $\frac{5}{2}x = \frac{25}{4}$

$x = \frac{\overset{5}{\cancel{25}}}{\underset{2}{\cancel{4}}} \times \frac{\cancel{2}}{\underset{1}{\cancel{5}}} = \frac{5}{2}$

(g) $7m + \frac{19}{2} = 13$

$7m = 13 - \frac{19}{2} = \frac{26 - 19}{2}$

$7m = \frac{7}{2}$

$m = \frac{\cancel{7}}{2} \times \frac{1}{\cancel{7}} = \frac{1}{2}$

(h) $6z + 10 = -2$

$6z = -2 - 10$

$6z = -12$

$z = \frac{\overset{2}{-12}}{\underset{1}{6}} = -2$

(i) $\frac{3l}{2} = \frac{2}{3}$

$l = \frac{2}{3} \times \frac{2}{3} = \frac{4}{9}$

(j) $\frac{2b}{3} - 5 = 3$

$\frac{2b}{3} = 3 + 5$

$\frac{2b}{3} = 8$

$b = \frac{\overset{4}{\cancel{8}} \times 3}{\underset{1}{\cancel{2}}} = 12$

2. (a) $2(x + 4) = 12$

$x + 4 = 6$

$x = 2$

(b) $3(n - 5) = 21$

$n - 5 = \frac{21}{3}$

n = 7 + 5 = 12

(c) $3(n-5) = -21$

$n - 5 = -7$

$n = -7 + 5 = -2$

(d) $-4(2+x) = 8$

$x = \frac{-\cancel{8}^{2}}{\cancel{4}_{1}} - 2$

$x = -4$

(e) $4(2-x) = 8$

$2 - x = 2$

$2 - 2 = x$

$0 = x$

3. (a) $4 = 5(p-2)$

$4 = 5p - 10$

$5p = 4 + 10$

$5p = 14$

$p = \frac{14}{5}$

(b) $-4 = 5(p-2)$

$-4 = 5p - 10$

$-4 + 10 = 5P$

$P = \frac{6}{5}$

(c) $16 = 4 + 3(t+2)$

$16 - 4 = 3t + 6$

$12 = 3t + 6$

$3t = 12 - 6$

$t = \frac{\cancel{6}^{2}}{\cancel{3}_{1}} = 2$

(d) $4 + 5(p-1) = 34$

$4 + 5p - 5 = 34$

$5p - 1 = 34$

$5p = 35$

$p = 7$

(e) $0 = 16 + 4(m-6)$

$-16 = 4m - 24$

$-16 + 24 = 4m$

$8 = 4m$

$m = 2$

4. (a) $x = 2$

$5x = 10$ ...(i)

$5x - 3 = 10 - 3$

$5x - 3 = 7$ ...(ii)

$\frac{5x-3}{2} = \frac{7}{2}$

$\frac{5x}{2} - \frac{3}{2} = \frac{7}{2}$ ...(iii)

(b) $x = -2$

$x - 2 = -2 - 2$

$x - 2 = -4$ ...(i)

$5(x-2) = (-4)5$

$5(x-2) = -20$ ...(ii)

$x + 24 = -20 + 24$

$x + 24 = 4$ ...(iii)

EXERCISE-9.4

1. (a) Let the number be x

A.T.Q

$8x + 4 = 60$

$8x = 56$

$x = 7$

(b) Let the number be x

A.T.Q

$$\frac{x}{5} - 4 = 3$$

$$\frac{x}{5} = 7$$

$$x = 7 \times 5 = 35$$

(c) Let the number be x

A.T.Q

$$\frac{3}{4}x + 3 = 21$$

$$\frac{3}{4}x = 18$$

$$x = \frac{\overset{6}{\cancel{18}} \times 4}{\underset{1}{\cancel{3}}} = 24$$

(d) Let the number be x

Twice of this number $= 2x$

A.T.Q

$2x - 11 = 15$

$2x = 15 + 11$

$$x = \frac{\overset{13}{\cancel{26}}}{\cancel{2}} = 13$$

(e) Let the number of book be x

A.T.Q

$50 - 3x = 8$

$50 - 8 = 3x$

$42 = 3x$

$$x = \frac{\overset{14}{\cancel{42}}}{\cancel{3}} = 14$$

(f) Let the number be x

A.T.Q

$$\frac{x + 19}{5} = 8$$

$x + 19 = 40$

$x = 40 - 19 = 21$

(g) Let the number be x

A.T.Q

$$\frac{5x}{2} - 7 = 23$$

$$\frac{5x}{2} = 23 + 7$$

$$\frac{5x}{2} = 30$$

$$x = \frac{\overset{6}{\cancel{30}} \times 2}{\underset{1}{\cancel{5}}} = 12$$

2. (a) Let the lowest score be l

A.T.Q

2l + 7 = 87

2l = 80

l = 40

∴ The lowest score = 40

(b) Let the base angles be x

The sum of all interior angles of a Δ = 180°

$x + x + 40 = 180°$

$2x + 40 = 180°$

$$x = \frac{\overset{70}{\cancel{140}}}{\cancel{2}} = 70°$$

(c) Let Rahul's score be x

Sachin's score = $2x$

Rahul's score + Sachin's score = 200 – 2

$x + 2x = 198$

$3x = 198$

$$\underline{x} = \frac{\overset{66}{\cancel{198}}}{\cancel{3}} = 66$$

Rahul's score = 66

Sachin's score = 66 × 2 = 132

3. (a) Let Parmit's marbles = x

A.T.Q

$5x + 7 = 37$

$5x = 30$

x = 6 marbles

(b) Let Laxmi's age = x years

A.T.Q

$3x + 4 = 49$

$3x = 45$

$x = 15$

$\therefore$ Laxmi's age is 15 years

(c) Let the number of fruit tree be x

A.T.Q

$3x + 2 = 77 \Rightarrow 3x = 77 - 2$

$$x = \frac{77 - 2}{3}$$

$$x = \frac{\overset{25}{\cancel{75}}}{\cancel{3}}$$

$\therefore$ The number of fruit tree was 25

4. Let the number be x

$(7x + 50) + 40 = 300$

$7x + 90 = 300$

$7x = 300 - 90$

$$x = \frac{\overset{30}{\cancel{210}}}{\cancel{7}}$$

$\therefore$ The number is 30

SUBJECT ENRICHMENT EXERCISE

I. (1) 1 (2) $\frac{x}{3} + 1 - 5$

(3) 0 (4) 56

(5) 16 (6) 26

II. (1) 20 (2) 11

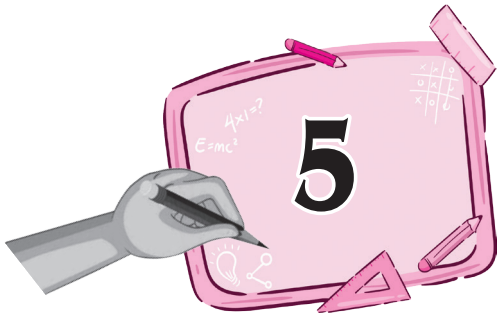
(3) 8 (4) 30

(5) 8

III. (1) True (2) True

(3) False (4) False

(5) True (6) False



Lines and Angles

EXERCISE-5.1

1. (a) $75° + 105° = 180°$
$\therefore$ This pair of angles are supplementary.

(b) $105° + 75° = 180°$
They are supplementary angles.

(c) $55° + 125° = 180°$
They are supplementary angles.

(d) $25° + 65° = 90°$
They are complementary angles.

(e) $40° + 50° = 90°$
They are complementary angles.

(f) $72° + 18° = 90°$
They are complementary angles.

2. (a) Complement of $55° = 90° - 55° = 35°$

(b) Complement of $50° = 90° - 50° = 40°$

(c) Complement of $20° = 90° - 20° = 70°$

(d) Complement of $48° = 90° - 48° = 42°$

(e) Complement of $57° = 90° - 57° = 33°$

(f) Complement of $32° = 90° - 32° = 58°$

(g) Complement of $18° = 90° - 18° = 72°$

(h) Complement of $12° = 90° - 12° = 78°$

3. (a) The adjacent angles are ($\angle$COA, $\angle$AOB); ($\angle$AOB, $\angle$BOD); ($\angle$COB, $\angle$BOD); ($\angle$COA, $\angle$AOD)

(b) The adjacent angles are ($\angle$AOX, $\angle$XOB); ($\angle$XOB, $\angle$BOY); ($\angle$BOY, $\angle$AOY); ($\angle$AOY, $\angle$AOX)

4. (a) $\angle x° + 120° = 180°$ (linear pair)
$x° = 180° - 120°$
$x = 60°$

(b) $(x + 20)° + x° = 180°$ (linear pair)
$2x + 20° = 180°$
$2x = 160°$
$x = 80°$

(c) $y° = 65°$ (vertically opposite)

(d) $m° + (m + 20)° = 180°$ (linear pair)

$2m + 20° = 180°$

$2m = 160°$

$$m = \frac{\overset{80°}{\cancel{160°}}}{\cancel{2}} = 80°$$

(e) $y° + 2y° = 180°$ (linear pair)

$3y° = 180°$

$$y = \frac{\overset{60°}{\cancel{180}}}{\cancel{3}}$$

$y = 60°$

5. (a) Supplement angle of $70° = 180° – 70° = 110°$

(b) Supplement angle of $20° = 180° – 20° = 160°$

(c) Supplement angle of $142° = 180° – 142° = 38°$

(d) Supplement angle of $132° = 180° – 132° = 48°$

(e) Supplement angle of $80° = 180° – 80° = 100°$

(f) Supplement angle of $115° = 180° – 115° = 65°$

(g) Supplement angle of $40° = 180° – 40° = 140°$

(h) Supplement angle of $75° = 180° – 75° = 105°$

EXERCISE-5.2

1. (a) The angle alternate to $\angle CPY = \angle DOX$

(b) The angle corresponding to $\angle BOX = \angle DPO$

(c) The angle corresponding to $\angle BOP = \angle DPY$

(d) The angle alternate to $\angle OPC = \angle BOP$

(e) The angle vertically opposite to $\angle YPD = \angle CPO$

(f) The angle alternate to $\angle OPD = \angle AOP$

(g) The angle vertically opposite to $\angle XOB = \angle AOP$

(h) The angle alternate to $\angle AOX = \angle DPY$

(i) The angle corresponding to $\angle CPY = \angle AOP$

2. Since l and m are two lines and line P is a transversal to them

$\angle 1 + 118° = 180°$ (linear pair)

$\angle 1 = 180° – 118°$

$\angle 1 = 62°$

$\angle 1$ and $62°$ are corresponding angles

Since, $\angle 1 = 62$, i.e., corresponding angles are equal so l || m.

3. (a) In figure l || m

$\therefore \angle x° = 105°$ (corresponding angles are equal)

(b) In figure l || m

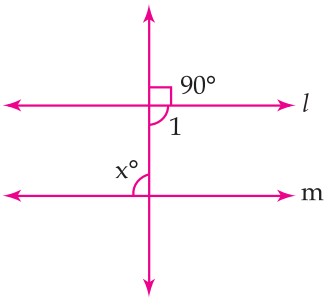
$\therefore x = 103°$ (alternate interior angles)

(c) In figure l || m

$\angle 1 + 90° = 180°$ (linear pair)

$\angle 1 = 90°$

$\angle x = \angle 1 = 90°$ (alternate interior angles)



(d) In figure l || m

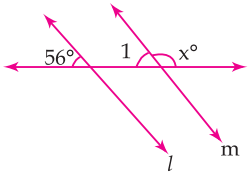
$\angle 1 = 56°$ (corresponding)

$\angle 1 + x° = 180°$ (linear pair)

$56° + x = 180°$

$x = 180° - 56°$

$x° = 124°$



4. l || m

$\angle 1 = 65°$

$\angle 3 = \angle 1 = 65°$ (vertical opposite angles are equal)

$\angle 1 + \angle 4 = 180°$ (linear pair)

$\angle 4 = 180° - 65°$

$= 115°$

$\angle 4 = \angle 2 = 115°$ (vertical opposite angles)

$\angle 5 = \angle 1 = 65°$ (corresponding angles)

$\angle 8 = \angle 4 = 115°$ (corresponding angles)

$\angle 6 = \angle 8 = 115°$ (vertical opposite angles)

$\angle 7 = \angle 5 = 65°$ (vertical opposite angles)

$\angle 1 = 65°, \angle 2 = 115°, \angle 3 = 65°, \angle 4 = 115°, \angle 5 = 65°, \angle 6 = 115°, \angle 7 = 65°, \angle 8 = 115°$

5. In figure l || m

$\angle 2 = (3x + 4)°$ (vertically opposite angles)

$\angle 1 = x°$ (vertically opposite angles)

$\angle 1 + \angle 2 = 180°$(sum of their interior angles on the same side of transversal is 180°)

$x° + (3x + 4)° = 180°$

$x + 3x + 4 = 180°$

$4x + 4 = 180°$

$4x = 176°$

$$x = \frac{\cancel{\cancel{176}}^{\cancel{88}^{44}}}{\cancel{4}^{\cancel{2}^{1}}}$$

$\angle 1 = x° = 44°$

$\angle 2 = 3x + 4 = 3(44) + 4 = 132° + 4° = 136°$

6. (a) $\angle AGF = ?$

$\angle AGE = \angle ABC = 80°$ (corresponding angle)

$\angle AGE + \angle AGF = 180°$

$80° + \angle AGF = 180°$

$\angle AGF = 180° - 80°$

$\angle AGF = 100°$

(b) $\angle DEF = \angle AGF = 100°$ (corresponding angles)

(c) $\angle BGF = \angle AGE = 80°$ (vertical opposite angles)

NCERT CORNER

EXERCISE-5.1

1. (i) Complement of $20° = 90° - 20° = 70°$

(ii) Complement of $63° = 90° - 63° = 27°$

(iii) Complement of $57° = 90° - 57° = 33°$

2. (i) Supplement of $105° = 180° - 105° = 75°$

(ii) Supplement of $87° = 180° - 87° = 93°$

(iii) Supplement of $154° = 180° - 154° = 26°$

3. (i) $65° + 115° = 180°$

They are supplementary angle

(ii) $63° + 27° = 90°$

They are complementary angle

(iii) $112° + 68° = 180°$

They are supplementary angle

(iv) $130° + 50° = 180°$

They are supplementary angle

(v) $45° + 45° = 90°$

They are complementary angle

(vi) $80° + 10° = 90°$

They are complementary angle

4. Let one of the two equal complementary angle be x

$\therefore x + x = 90°$

$2x = 90$

$x = 45°$

Thus 45 is equal to its complement.

5. Let x be two equal to its supplement

$\therefore x + x = 180°$

$2x = 180°$

$x = 90°$

Thus, 90° is equal to its supplement

6. If $\angle 1$ is decreased then, $\angle 2$ will increase with the same measure, so that both the angles still remain supplementary.

7. (i) No, because the sum of two acute angles is less than 180°
(ii) No, because the sum of two obtuse angles is more than 180°
(iii) Yes, because the sum of two right angles is 180°

8. Let the complementary angles be x and y
$x + y = 90°$
It is given that $x > 45°$
Adding y both sides
$x + y > 45 + y$
$90° > 45 + y$
$90 – 45° > y$
$y < 45°$
Thus, its complementary angle is less than 45°

9. (i) Yes, in $\angle AOE$, OC is common arm.
(ii) No, they have no common arms so opposite side of common arm.
(iii) Yes, they form linear pair
(iv) Yes, they are supplementary
(v) Yes, they are vertical opposite angles
(vi) Vertical opposite angles of $\angle 5$ = COB

10. (i) Vertically opposite angles are ($\angle 1$, $\angle 4$), ($\angle 5$, $\angle 2 + \angle 3$)
(ii) Linear pairs are ($\angle 1$ and $\angle 5$), ($\angle 4$ and $\angle 5$)

11. No, $\angle 1$ is not adjacent to $\angle 2$ because their vertex is not common.

12. (i) $x = 55°$ (vertical opposite angles)
$x + y = 180°$ (linear pair)
$55° + y = 180°$
$y = 180° – 55°$
$y = 125°$
$z = y = 125°$ (vertically opposite angles)
(ii) $z = 40°$ (vertically opposite angles)
$y + z = 180°$ (linear pair)
$y + 40° = 180°$
$y = 140°$
$y = x + 25°$ (vertical opposite angles)
$140° = x + 25$
$x = 140° – 25°$
$x = 115°$

13. (i) 90°
(ii) 180°
(iii) Supplementary
(iv) Linear pair
(v) Equal
(vi) Obtuse angles

14. (i) Obtuse vertical opposite angles means greater than 90° and equal ∠AOD = ∠BOC

(ii) Adjacent complementary angles means angles have common vertex, common arm, non-common arms are on either side of common arm and sum of angles is 90° i.e., ∠AOB ∠EOA.

(iii) ∠EOB, ∠EOD

(iv) ∠EOA, ∠EOC

(v) ∠AOB, ∠AOE; ∠AOE, ∠EOD; ∠EOD, ∠COD

EXERCISE-5.2

1. (i) Given a || b, then ∠1 = ∠5 (corresponding angles)

If two parallel lines are cut by a transversal, each pair of corresponding angles are equal to measure.

(ii) Given ∠4 = ∠6, then a || b (alternate interior angles)

When a transversal cuts two lines such that pairs of alternate angles are equal, the lines have to be parallel.

(iii) Given ∠4 + ∠5 = 180°, then a || b

[interior angles on the same side of the transversal are 180°]

When a transversal cuts two lines, such that pairs of interior angles on the same side of transversal are supplementary, the lines have to be parallel.

2. (i) ∠1, ∠5; ∠2, ∠6; ∠4, ∠8; ∠3, ∠7

(ii) ∠2, ∠8 and ∠2, ∠5

(iii) ∠2, ∠5 and ∠3, ∠8

(iv) ∠1, ∠3; ∠2, ∠4; ∠5, ∠7; ∠6, ∠8

3. p || q and cut a transversal line

125° + e = 180° (linear pair)

e = 180° – 125 = 55°

f = e = 55° (vertically opposite angles)

a = e = 55° (corresponding angles)

c = a = 55° (vertically opposite angles)

f + d = 180° (same side of the transversal is 180°)

55° + d = 180°

d = 180° – 55° = 125°

b = d = 125° (vertical opposite angles)

4. (i) l || m and t is transversal line

∴ Interior vertical opposite angle between lines l and t = 110°

∴ 110° + x = 180° (supplementary angles)

x = 70°

(ii) Given l || m and a || b

x = 100° (corresponding angles)

5. (i) Given AB || DE, and BC is a transversal line and ∠ABC = 70°, then

∵ ∠DGC = ∠ABC = 70° (corresponding angles)

(ii) BC || EF and DE is a transversal line and ∠DGC = 70°

∵ ∠DEF = ∠DGC = 70° (corresponding angles)

6. (i) $126° + 44° = 170°$

l is not parallel to m because sum of interior opposite angles should be 180°

(ii) $75° + 75° = 150°$

l is not parallel to m because sum of angles does not obey the property of parallel lines.

(iii) $57° + 123° = 180°$

l is parallel to m due to supplementary angles property of parallel lines.

(iv) $98° + 72° = 170°$

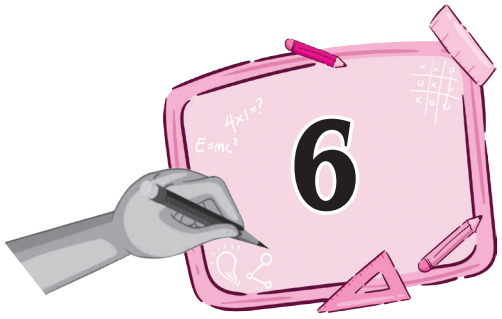
l is not parallel to m because sum of angles does not obey the property of parallel lines.

SUBJECT ENRICHMENT EXERCISE

I. (1) Equidistant
(2) Transversal
(3) Equal
(4) Supplementary
(5) Total of the interior angle on the same side of the transversal is 180°
(6) 0
(7) 2
(8) Parallel
(9) Parallel

II. (1) Cannot
(2) Cannot
(3) 30°, 150°
(4) 180°
(5) 1440°
(6) Can
(7) Cannot

III. (1) True
(2) True
(3) True
(4) True
(5) True



The Triangle and Its Properties

EXERCISE-6.1

1. (a) Obtuse triangle (b) Right triangle
(c) Right triangle (d) Acute triangle

2. (a) Equilateral triangle (b) Isosceles triangle
(c) Isosceles triangle (d) Scalene triangle

3. AD is a median of Δ ABC
AE is a altitude of Δ ABC
No, AD $\neq$ AE because AE is right angle like 90°.

4. (a) $b = 42° + 68° = 110°$ (exterior angles property)
$a + b = 180°$ (linear pair)
$a + 110° = 180°$
$a = 180° - 110° = 70°$

(b) $a + 60° + 67° = 180°$ (sum of triangle is 180°)
$a = 180° - 127° = 53°$
$b = 67° + 60° = 127°$ (exterior angles property)

(c) In triangle
$35 + 90° + a = 180°$ (sum of triangle is 180°)
$a = 180° - 125°$
$a = 55°$
$a + b = 180°$ (linear pair)
$55° + b = 180°$
$b = 180 - 55° = 125°$

(d) $b = 75° + 60°$ (exterior angles sum of interior opposite angles)

EXERCISE-6.2

1. (a) $\angle A + \angle B + \angle C = 180°$ (angle sum property of a Δ)
$50° + 60° + 70° = 180°$
$180° = 180°$
$\therefore$ Yes, these angles can form a triangle

(b) $\angle P + \angle Q + \angle R = 180°$ (angle sum property of a Δ)
$76° + 64° + 40° = 180°$
$180° = 180°$
$\therefore$ Yes, these angles can make a triangle

(c) $\angle x + \angle y + \angle z = 180°$
$20 + 60 + 55 = 180°$
$135 \neq 180°$
$\therefore$ No, these angles cannot make a triangle

2. (a) $\angle A + \angle B + \angle C = 180°$ (angle sum property of a Δ)
$\angle A + 90° + 40° = 180°$
$\angle A + 130° = 180°$
$\angle A = 50°$

(b) $\angle A + \angle B + \angle C = 180°$ (angle sum property of a Δ)

(c) $\angle B = \angle A + \angle ACB$ (exterior angle property)
$120° = \angle A + (180° - 130°)$
$120° = \angle A + 50$
$\angle A = 120° - 50° = 70°$

(d) $\angle P + \angle Q + \angle R = 180°$ (angle sum property of a Δ)
$\angle P + 69° + 80° = 180°$
$\angle P = 180° - 149° = 31°$

(e) $\angle XYZ = 180° - 130° = 50°$ (linear pair)
$\therefore \angle X + \angle Y + \angle Z = 180°$ (angle sum of property of a Δ)
$58° + 50° + \angle Z = 180°$
$\angle Z = 180° - 108° = 72°$

(f) BC || AP
$\angle A + \angle B = 180°$ (sum angle on same side of transversal is 180°)
$(70° + x) + 60° = 180°$
$x + 130° = 180°$
$x = 180° - 130° = 50°$

EXERCISE-6.3

1. (a) $3 + 4 = 7$ cm $= 7$ cm, $4 + 7 = 11$ cm > 3 cm, $3 + 7 = 10 > 4$ cm
Hence, this triangle is not possible

(b) $4 + 3 = 7$ cm < 11 cm
$3 + 11 = 14 > 4$ cm
$4 + 11 = 15 > 3$ cm
Hence, this triangle is not possible.

(c) $7 + 4 = 11$ mm > 4 mm
$4 + 4 = 8$ mm > 7 mm
$7 + 4 = 11$ mm > 4 mm
Hence, this triangle is possible

(d) 3 cm $+ 1.23$ cm $= 4.23$ cm < 5 cm
$3 + 5 = 8 > 1.23$ cm
$5 + 1.23 = 6.23 > 3$ cm
Hence, this triangle is not possible

(e) $11 + 10 = 21 > 10$
$10 + 11 = 21 > 11$
$11 + 11 = 22 > 10$
Hence, this triangle is possible

(f) $3 + 3 = 6 > 3$
Hence, this triangle is possible

(g) $3 + 10 = 13 > 8$
$10 + 8 = 18 > 3$
$8 + 3 = 11 > 10$
Hence, this triangle is possible

(h) $9 + 17 = 26 > 8$
$8 + 17 = 25 > 9$
$9 + 8 = 17 = 17$
Hence, this triangle is not possible.

2. We know that the sum of two sides of a Δ is always greater than the third side.
$\therefore$ Third side has to be less than the sum of the two sides. The third side is less than $4 + 7 = 11$ cm
The side cannot be less than the different of the two sides. Thus, the third side has to be more than $7 - 4 = 3$ cm
The length of the third side could be any length greater than 3 and less than 11 cm.

EXERCISE-6.4

1. (a) In Δ ABC
$AC^2 = AB^2 + BC^2$
$x^2 = (12)^2 + (9)^2$
$x^2 = 144 + 81$
$x^2 = 225$
so, $x = 15$

(b) In Δ ABC
$AC^2 = AB^2 + BC^2$
$(11)^2 = (9)^2 + (x)^2$
$121 = 81 + x^2$
$x^2 = 121 - 81 = 40$
so, $x = \sqrt{40} = \sqrt{2 \times 2 \times 2 \times 5}$
$= 2\sqrt{10}$ cm

(c) In Δ ABC
$AC^2 = AB^2 + BC^2$
$(25)^2 = (24)^2 + x^2$
$625 = 576 + x^2$
$x^2 = 625 - 576$
$x^2 = 49 = (x)^2 = (7)^2$
so, $x = 7$

(d) In Δ ABC

$AC^2 = AB^2 + BC^2$

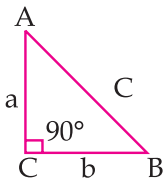
$x^2 = (24)^2 + (7)^2$

$x^2 = 576 + 49$

$x^2 = 625$

so, $x = 25$

2. (a) $a = 6, b = 8$



In Δ ABC

$AB^2 = AC^2 + BC^2$

$(c)^2 = a^2 + b^2$

$c^2 = (6)^2 + (8)^2$

$c^2 = 36 + 64$

$c^2 = 100$

$c = 10$

(b) In Δ ABC

$AB^2 = AC^2 + BC^2$

$c^2 = a^2 + b^2$

$(13)^2 = (5)^2 + b^2$

$b^2 = (13)^2 – (5)^2$

$b^2 = 169 – 25$

$b^2 = 144$

$b = 12$

(c) $c^2 = a^2 + b^2$

$(25)^2 = a^2 + (24)^2$

$625 = a^2 + 576$

$a^2 = 625 – 576$

$a^2 = 49$

$a = 7$

(d) $c^2 = a^2 + b^2$

$c^2 = (10)^2 + (24)^2$

$= 100 + 576$

$c^2 = 676$

$(c)^2 = (26)^2$

So, $c = 26$

(e) $a^2 + b^2 = c^2$

$(16)^2 + (30)^2 = c^2$

$256 + 900 = c^2$

$1156 = c^2$

$34 = c$

(f) $a^2 + b^2 = c^2$

$a^2 + (3)^2 = (5)^2$

$a^2 = 25 – 9$

$a^2 = 16$

$a = 4$

(g) $a^2 + b^2 = c^2$

$(40)^2 + b^2 = (41)^2$

$1600 + b^2 = 1681$

$b^2 = 1681 – 1600$

$b^2 = 81$

$b = 9$

(h) $c^2 = a^2 + b^2$

$(17)^2 = a^2 + (15)^2$

$289 = a^2 + 225$

$a^2 = 289 \ \ 225$

$a^2 = 64$

$a = 8$

3. (a) $(3)^2 + (3)^2 = (5)^2$

$9 + 9 = 25$

$18 \neq 25$

So, this is not a right angled triangle

(b) $(6)^2 + (5)^2 = (8)^2$

$36 + 25 = 64$

$61 \neq 64$

So, this is not a right angled triangle

(c) $(7)^2 + (8)^2 = (9)^2$

$49 + 64 = 81$

$113 \neq 81$

So, this is not a right angled triangle

(d) $(8)^2 + (15)^2 = (16)^2$

$64 + 225 = 256$

$289 \neq 256$

So, this is not a right angled triangle

(e) $(10)^2 + (24)^2 = (26)^2$

$100 + 576 = 676$

$676 = 676$

So, this is a right angled triangle

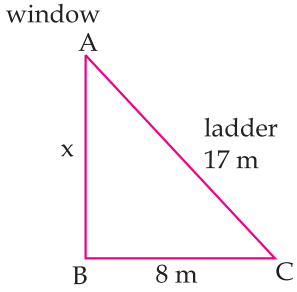
(f) $(11)^2 + (14)^2 = (18)^2$

$121 + 196 = 324$

$317 \neq 324$

So, this is not a right angled triangle

4. Let the length of window from the ground = x



In Δ ABC

$AC^2 = AB^2 + BC^2$

$(17)^2 = (x)^2 + (8)^2$

$289 = x^2 + 64$

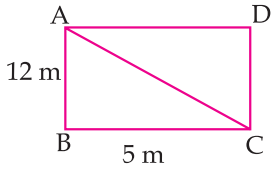
$289 - 64 = x^2$

$x^2 = 225$

So, $x = 15$

$\therefore$ The height of window from the ground = 15 m

5. In Δ ABC



$AB^2 + BC^2 = AC^2$

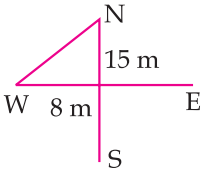
$(12)^2 + (5)^2 = AC^2$

$AC^2 = 144 + 25 = 169$

$AC = 13$ m

$\therefore$ The length of the diagonal AC = 13 m

6. $(\text{Base})^2 + (\text{Perpendicular})^2 = (\text{Hypotenuse})^2$



$(8)^2 + (15)^2 = (\text{Hypotenuse})^2$

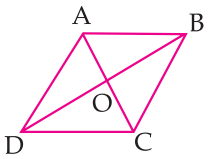
$64 + 225 = (\text{Hypotenuse})^2$

$289 = (\text{Hypotenuse})^2$

Hypotenuse = 17 m

$\therefore$ Distance walked by Lovely is 17 m

7. Let ABCD be a rhombus all sides are of equal length and its diagonal AC and BD are intersecting each other at point O.



Diagonals in a rhombus bisect each other at 90°.

It can be observed that

$$AO = \frac{AC}{2} = \frac{10}{2} = 5 \text{ cm}$$

$$BO = \frac{BD}{2} = \frac{24}{2} = 12 \text{ cm}$$

In Δ AOB

$OA^2 + OB^2 = AB^2$

$(5)^2 + (12)^2 = AB^2$

$25 + 144 = AB^2$

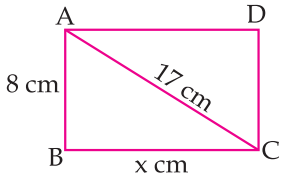
$AB^2 = 169$

AB = 13 CM

$\therefore$ The length of the side of rhombus is 13 cm

Perimeter of rhombus = 4 × side = 4 × 13 = 52 cm

8. Let the length of rectangle = x cm



In Δ ABC

$(8)^2 + x^2 = (17)^2$

$64 + x^2 = 289$

$x^2 = 289 - 64$

$x^2 = 225$

$x = 15$ cm

$\therefore$ The length of the rectangle = 15 cm

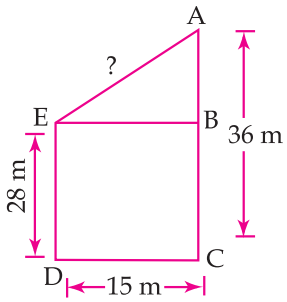
Area of rectangle = L × B

= 15 × 8 = 120 cm^2

Perimeter of rectangle = 2(L + B)

= 2 (15 + 8) = 2(23) = 46 cm

9. Given:- AC and ED are two towers of height 36 m and 28 m respectively



To find:- AE

Construction = Join BE

Proof (solution) = In figure BCDE

Since ED $\perp$ DC, BC $\perp$ CD

$\therefore$ BCDE is a rectangle

So, AC = AB + BC

AC = AB + ED

36 = AB + 28

AB = 8 m

Now In Δ ABE, $\angle$ABE = 90°

Using pythagorous theorem:-

$AE^2 = AB^2 + BE^2$

$AE^2 = (8)^2 + (15)^2$

= 64 + 225

= 289

AE = 17 m

Hence, the distance between the tops of the towers = 17 m

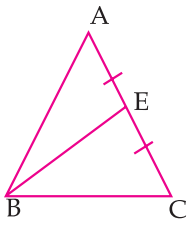
NCERT CORNER

EXERCISE-6.1

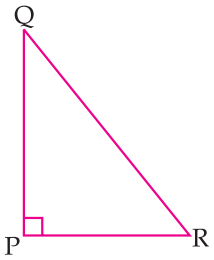
1. (a) Altitude (b) Median

(c) No

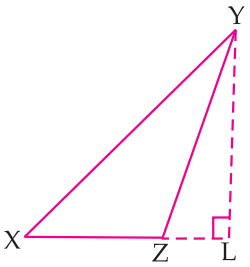
2. (a)



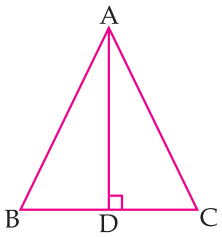
(b)



(c)



3. Draw a line segment AD ⊥ BC. It is an altitude for this triangle. It can be observed that the length of BD and DC is also same. Therefore AD is also a median of this triangle.



EXERCISE-6.2

1. (i) $x = 50° + 70° = 120°$ [exterior angle theorem]

(ii) $x = 65° + 45° = 110°$ [exterior angle theorem]

(iii) $x = 40° + 30° = 70°$ [exterior angle theorem]

(iv) $x = 60° + 60° = 120°$ [exterior angle theorem]

(v) $x = 50° + 50° = 100°$ [exterior angle theorem]

(vi) $x = 60° + 30° = 90°$ [exterior angle theorem]

2. (i) $x + 50° = 115°$ [exterior angle theorem]

$x = 115° - 50° = 65°$

(ii) $70° + x = 100°$

$x = 30°$

(iii) $x + 90° = 125°$

$x = 125° - 90° = 35°$

(iv) $x + 60° = 120°$

$x = 60°$

(v) $x + 30° = 80°$

$x = 50°$

(vi) $x + 35° = 75°$

$x = 75° - 35°$

$x = 40°$

EXERCISE-6.3

1. The sum of all interior angles of a Δ is 180°. By using this property, these problems can be solved as follows:-

(i) $x + 50° + 60° = 180°$

$x = 180° - 110° = 70°$

(ii) $x + 90° + 30° = 180°$

$x = 180° - 120° = 60°$

(iii) $x + 110° + 30° = 180°$

$x = 180° - 140° = 40°$

(iv) $x + x + 50° = 180°$

$2x = 180° - 50°$

$2x = 130° \Rightarrow x = 65°$

(v) $x + x + x = 180°$

$3x = 180°$

$x = 60°$

(vi) $x + 2x + 90° = 180°$

$3x = 90°$

$x = \frac{\overset{30°}{\cancel{90°}}}{\cancel{3}} = 30°$

2. (i) $y + 120° = 180°$ (linear pair)

$y = 60°$

$x + 50 = 120°$ (exterior angle theorem)

$x = 70°$

(ii) $y = 80°$ (vertical opposite angles)

$x + y + 50° = 180°$ (angle sum property)

$x + 80° + 50° = 180°$

$x = 180° - 130° = 50°$

(iii) $x + 50° + 60°$ (exterior angle theorem)

$x = 110°$

$x + y = 180°$ (linear pair)

$y = 180° - x$

$= 180° - 110° = 70°$

(iv) $x = 60°$ (vertical opposite angles)

$x + y + 30° = 180°$ (Angle sum of Δ)

$60° + y + 30° = 180°$

$y = 90°$

(v) $y = 90°$ (vertical opposite angles)

$x + x + y = 180°$ (Angle sum of Δ)

$2x + y = 180°$

$2x = 180° - 90°$

$x = \frac{\overset{45°}{\cancel{90°}}}{\cancel{2}} = 45°$

(vi) $y = x$ (vertical opposite angles)

$b = x$ (vertical opposite angles)

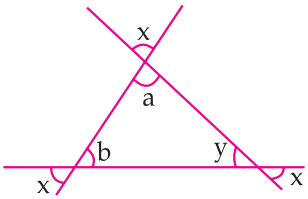
$a = x$ (vertical opposite angles)

$a + b + y = 180°$ (angle sum property)

$x + x + x = 180°$

$3x = 180°$

$$x = \frac{\overset{60°}{\cancel{180°}}}{\cancel{3}} = 60°$$



EXERCISE-6.4

1. In a Δ, the sum of the lengths of either two sides is always greater than the third side.

(i) Given that 2 cm, 3 cm and 5 cm are sides of Δ

Here $2 + 3 = 5$ cm $= 5$ cm

$3 + 5 = 8$ cm > 2 cm

$2 + 5 = 7$ cm > 3 cm

$\therefore$ The triangle is not possible

(ii) Given that 3 cm, 6 cm, 7 cm are sides of Δ

$3 + 6 > 7$

$6 + 7 > 3$

$7 + 3 > 6$

$\therefore$ This triangle is possible

(iii) Given that 6 cm, 3 cm, 2 cm are sides of Δ

$6 + 3 > 2$

$6 + 2 > 3$

$2 + 3 < 6$

$\therefore$ This triangle is not possible

2. If o is a point in the interior of a given triangles then three triangles Δ OPQ, Δ ORP and Δ OQR can be constructed. In a Δ, the sum of the lengths of either two sides is always greater than the third side.

(i) Yes, As Δ OPQ is a triangle with sides OP, OQ and PQ

OP + OQ > PQ

(ii) Yes, OQ + OR > QR

(iii) Yes, as Δ ORP is a triangle with sides OR, OP and PR

OR + OP > PR

3. In a triangle, the sum of the lengths of either two sides is always greater than the third side.

In Δ ABM,

AB + BM > AM ...(i)

Similarly in Δ ACM

AC + CM > AM ...(ii)

Adding equation (i) and (ii)

AB + BM + AC + MC > AM + AM

AB + BC + AC > 2AM

Yes, the given expression is true

4. In Δ ABC

AB + BC > CA ...(1)

In Δ BCD

BC + CD > DB ...(2)

In Δ CDA

CD + DA > AC ...(3)

In Δ DAB

DA + AB > DB ...(4)

Adding (1), (2), (3) and (4)

AB + BC + BC + CD + CD + DA + DA + AB > 2AC + 2DB

2AB + 2BC + 2CD + 2DA > 2AC + 2BD

2(AB + BC + CD + DA) > 2(AC + BD)

AB + BC + CD + DA > AC + BD

Yes, the given expression is true

5. In Δ OAB

OA + OB > AB ...(1)

In Δ OBC

OB + OC > BC ...(2)

In Δ OCD

OC + OD > CD ...(3)

In Δ ODA

OD + OA > DA ...(4)

Adding (1), (2), (3) and (4)

OA + OB + OB + OC + OC + OD + OD + OA > AB + BC + CD + DA

2OA + 2OB + 2OC + 2OD > AB + BC + CD + DA

2(OA + OC) + 2(OB + OD) > AB + BC + CD + DA

2AC + 2BD > AB + BC + CD + DA

2(AC + BD) > AB + BC + CD + DA

Yes, the given expression is true

6. In a triangle, the sum of the lengths of either two sides is always greater than the third side and also the difference of the length of either two sides is always lesser than the third side.

Here the third side will be lesser than the sum of these two (12 + 15 = 27) and also, it will be greater than the different of these two (15 – 12 = 3).

Therefore those two measures are 27 cm and 3 cm

EXERCISE-6.5

1. $PQ^2 + PR^2 = QR^2$

$(10)^2 + (24)^2 = QR^2$

$100 + 576 = QR^2$

$676 = QR^2$

QR = 26 cm

2. In Δ ABC

$AB^2 = AC^2 + BC^2$

$AB^2 - AC^2 = BC^2$

$(25)^2 - (7)^2 = BC^2$

$BC^2 = 625 - 49 = 576$

BC = 24 cm

3. $(15)^2 = (12)2 + a^2$

$225 = 144 + a^2$

$a^2 = 225 - 144 = 81$

a = 9 m

4. (a) $(2.5)^2 + (6)^2 = (6.5)^2$

$6.25 + 36 = 42.25$

$42.25 = 42.25$

$\therefore$ This triangle is a right angled triangle

(b) $(2)^2 + (2)^2 = (5)^2$

$4 + 4 \neq 25$

$\therefore$ This triangle is not a right angled triangle

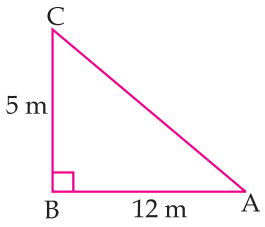
(c) $(1.5)^2 + (2)^2 = (2.5)^2$

$2.25 + 4 = 6.25$

$6.25 = 6.25$

$\therefore$ This triangle is a right angled triangle

5. In figure BC shows the unbroken part of the tree. Point C shows the point where the tree broke and CA shows the broken part of the tree.



In Δ ABC

$AB^2 + BC^2 = AC^2$

$(12)^2 + (5)^2 = AC^2$

$144 + 25 = AC^2$

$AC^2 = 169$

AC = 13 m

Thus, the original height of the tree = AC + BC = 13 + 5 = 18 m

6. The sum of the measures of all interior angles of a Δ = 180°

$\angle P + \angle Q + \angle R = 180°$

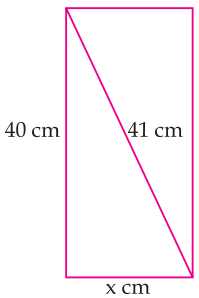
$\angle P + 25° + 65° = 180°$

$\angle P = 180° - 90° = 90°$

Δ, PQR is a right angled at point P

Hence $(PR)^2 + (PQ)^2 = (QR)^2$

7. In a rectangle, all interior angles are of 90° measure



$(41)^2 = (40)^2 + x^2$

$1681 = 1600 + x^2$

$x^2 = 1681 - 1600 = 81$

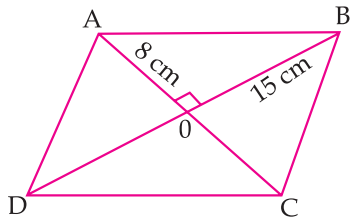
x = 9 cm

Perimeter = 2(L + B) = 2(x +40)

= 2(9 + 40)

= 2(49) = 98 cm

8. Let ABCD is a rhombus, (all sides are of equal length) and its diagonals, AC and BD, are intersecting each other at point o. Diagonals of rhombus bisect each other at 90°. It can be observed that



$AO = \frac{AC}{2} = 8$ cm

$BO = \frac{BD}{2} = 15$ cm

In Δ AOB

$OA^2 + OB^2 = AB^2$

$(8)^2 + (15)^2 = AB^2$

$64 + 225 = AB^2$

$289 = AB^2$

$AB = \sqrt{289} = 17$ cm

The length of the side of rhombus is 17 cm

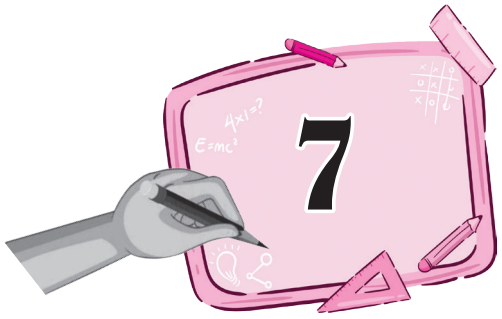
Perimeter = 4 × side = 4 × 17 = 68 cm

SUBJECT ENRICHMENT EXERCISE

I. (1) 180°
(2) Greater than the third side
(3) 65°
(4) Are supplementary
(5) $a^2 + b^2 = c^2$
(6) Greater than each one of its interior opposite angles
(7) Yes
(8) 80°
(9) AB
(10) 17 m

II. (1) Two
(2) One
(3) One
(4) Two
(5) 10
(6) No
(7) 60°
(8) Yes

III. (1) True
(2) False
(3) True
(4) False
(5) True



Congruence of Triangles

EXERCISE-7.1

1. No, any line segment are not congruent because length of each line segment are different.

2. Yes, $\overline{BA} \cong \overline{DC}$ because AB and BA are same line and CD and DC are same line.

3. $\overline{PQ} \cong \overline{QS}$ (given)

$\therefore$ PQ = QS

But QS = QR + RS

QS > RS

So, $\overline{PQ}$ and $\overline{RS}$ is not congruent to each other.

No, $\overline{PQ} \ncong \overline{RS}$

4. (a) In figure $\overline{PQ} \cong \overline{QR} \cong \overline{PR}$ because all sides of equilateral triangle are equal. So, all sides are congruent.

(b) All sides of squares are equal. So $\overline{PQ} \cong \overline{QR} \cong \overline{RS} \cong \overline{PS}$

(c) In rectangle opposite sides are equal. So $\overline{AB} \cong \overline{DC}$ and $\overline{AD} \cong \overline{BC}$

5. (a) 50°

(b) 35°

(c) 30°

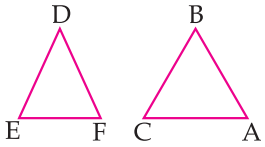
(d) 110°

(e) 90°

(f) 50°

Figure (a) and (f) are congruent to each other.

6. If Δ DEF $\cong \Delta$ BCA then



(a) The corresponding parts of D = B

(b) The corresponding parts of $\overline{DF} = \overline{BA}$

(c) The corresponding parts of F = A

(d) The corresponding parts of $\overline{CA} = \overline{EF}$

EXERCISE-7.2

1. (a) In Δ ABC and Δ DEF

AC = DE	(given)
BC = FE	(given)
$\angle C = \angle E$	(given)
$\therefore \Delta ABC \cong \Delta DFE$	(SAS)

(b) In Δ PQR and Δ XYZ

RQ = ZY (given)

$\angle R = \angle Z$ (given)

$\angle Q = \angle Y$ (given)

$\therefore \Delta PQR \cong \Delta XYZ$ (ASA)

(c) In Δ MNO and Δ DFE

MO = DE (given)

$\angle N = \angle F$ (each 90°)

$\therefore$ Both triangles are not congruent

(d) In Δ PQR and Δ STU

PQ = UT

QR = TS

RP = SU

$\therefore \Delta PQR \cong \Delta UTS$ (SSS)

(e) In Δ KLM and Δ ABC

KL = BA (given)

LM = AC (given)

$\angle M = \angle C$ (given)

$\therefore$ Both triangles are not congruent because the given conditions which ar not satisfy the congruency rule.

(f) In Δ XYZ and Δ PQR

$\angle Z = \angle R$ (given)

XZ = QR (given)

$\angle X = \angle Q$ (given)

$\therefore \Delta YZX \cong \Delta PRQ$ (ASA)

(g) In Δ UWV and Δ CBA

$\angle V = \angle A$ (given)

$\angle W = \angle B$ (given)

$\angle U = \angle C$ (given)

$\therefore \Delta UVW \cong \Delta CAB$ (AAA)

(h) In Δ ABC and Δ DEF

AB = DE = 4 cm (given)

BC = EF = 5 cm (given)

$CA \neq FD$ (given)

$\therefore$ Both triangles are not congruent

(i) In Δ ABC and Δ DEF

AB = DE (= 4 cm)

AC = EF (= 3 cm)

CB = FD (= 5 cm)

$\therefore \Delta ABC \cong \Delta EDF$ (SSS)

(j) In Δ PQS and Δ PRS

PQ = PR (= 4.8 cm)

QS = RS (= 3.2 cm)

$\angle$PSQ = $\angle$PSR (common)

$\therefore \Delta$ PQS $\cong \Delta$ PRS

Not congruent

(k) In Δ MNO and Δ POQ

MO $\neq$ OQ, NO $\neq$ PO

Both triangles are not congruent

2. (a) Given that Δ XYZ $\cong \Delta$ RPQ

Congruent sides are RP = XY, QP = YZ and RQ = XZ

Congruent angles are $\angle$R = $\angle$X, $\angle$P = $\angle$Y and $\angle$Q = $\angle$Z

(b) In Δ XYZ $\cong \Delta$ PQR ...(given)

Congruent sides are XY = PQ, YZ = QR and ZX = RP

Congruent angles are $\angle$X = $\angle$P, $\angle$Y = $\angle$Q and $\angle$Z = $\angle$R

(c) Δ XYZ $\cong \Delta$ QPR

Congruent sides are XY = QP, YZ = PR and ZX = RQ

Congruent angles are $\angle$X = $\angle$Q, $\angle$Y = $\angle$P and $\angle$Z = $\angle$R

3. In Δ ABD and Δ CDB

AB = CD (given)

AD = BC (given)

DB = DB (common)

$\therefore \Delta$ ABD $\cong \Delta$ CDB (SSS)

$\angle$1 = $\angle$3 (CPCT)

$\angle$4 = $\angle$2 (CPCT)

$\angle$A = $\angle$C (CPCT)

4. (a) In Δ PQM and Δ PRM

PQ = PR (given)

$\angle$QPM = $\angle$RPM (given)

PM = PM (common)

$\therefore \Delta$ PQM $\cong \Delta$ PRM (SAS)

(b) $\therefore$ $\angle$PMQ = $\angle$PMR (CPCT)

But $\angle$PMR + $\angle$PMQ = 180° (linear pair)

$\angle$PMQ + $\angle$PMQ = 180°

2$\angle$PMQ = 180°

$\angle$PMQ = 90°

(c) MQ = MR (CPCT)

So, M is the mid point of QR

5. $\overline{KL}$ and $\overline{MN}$ bisect each other at o

$\therefore$ KO = OL and MO = ON

$\angle$KOM = $\angle$LON

(a) In Δ KOM and Δ NOL
KO $\neq$ NO
MO $\neq$ OL
So, Δ KOM and Δ NOL are not congruent.

(b) In Δ KOM and Δ LON
KO = LO
MO = NO
$\angle$KOM = $\angle$LON
$\therefore$ Δ KOM $\cong$ Δ LON (SAS)

(c) Δ KOM $\cong$ Δ OLN = false
Because KO = OL, But $\angle$KOM $\neq$ $\angle$OLN
So, this expression is not true.

(d) Δ KOM $\cong$ Δ ONL = false
KO $\neq$ ON, and $\angle$KOM $\neq$ $\angle$ONL
So, This expression is not true.

6. Given:-
In ABC, AB = AC and AD $\perp$ BC
To prove:- $\angle$B = $\angle$C
Proof :- In Δ ABD and Δ ACD
AB = AC (given)
$\angle$ADB = $\angle$ADC (each 90°)
AD = AD (common)
$\therefore$ Δ ABD $\cong$ Δ ACD (RHS)
$\angle$B = $\angle$C (CPCT)

7. (a) In Δ PQO and Δ PRO
PQ = PR (given)
PO = PO (common)
OQ = OR (given)
$\therefore$ Δ PQO = Δ PRO (SSS)

(b) $\angle$POQ = $\angle$POR (CPCT)
$\angle$POQ + $\angle$POR = 180° (linear)
$\angle$POQ + $\angle$POQ = 180°
2$\angle$POQ = 180°
$\angle$POQ = 90°
$\angle$POQ = $\angle$POR = 90°

(c) $\angle$Q = $\angle$R (CPCT)

(d) $\angle$OPQ = $\angle$RPO (CPCT)

8. XP is the bisector of $\angle$X.
Therefore $\angle$YXP = $\angle$ZXP
XP $\perp$ YZ
$\therefore$ $\angle$XPY = $\angle$XPZ (each 90°)

In Δ XYP and Δ XZP

$\angle$YXP = $\angle$XZP	(given)
XP = XP	(common)
$\angle$XPY = $\angle$XPZ	(given)
$\therefore$ ΔXYP = ΔXZP	(ASA)
$\therefore$ XY = XZ	(CPCT)

9. In Δ MNO and ΔQPO

MN = QP	(given)
$\angle$N = $\angle$P	(90°)
MO = OQ	(RHS)
$\therefore$ Δ MNO $\cong$ ΔQPO	(RTS)
$\therefore$ OP = NO	(CPCT)

10. (a) In Δ POQ and Δ SOR

OP = OS	(given)
OQ = OR	(given)
$\angle$POQ = $\angle$SOR	(vertical opposite angles)
$\therefore$ Δ POQ = Δ SOR	(SAS)

(b)

$\angle$P = $\angle$S	(CPCT)
$\angle$Q = $\angle$R	(CPCT)

(c) Yes PQ || RS, because a transversal intersect two lines such that alternate interior angles are equal then. Both lines are parallel.

NCERT CORNER

EXERCISE-7.1

1. (a) They have the same length

(b) 70°

(c) m$\angle$A = m$\angle$B

2. (i) Sheets of same letter pad. (ii) Biscuit in the same packet.

3. If these triangles are congruent, then the corresponding angles and sides will be equal to each other

$\angle A = \angle F, \angle B = \angle E, \angle C = \angle D$

$\overline{AB} = \overline{FE}, \overline{BC} = \overline{ED}, \overline{CA} = \overline{DF}$

4. (i) $\angle E = \angle C$ (iii) $\angle F = \angle A$

(ii) $\overline{EF} = \overline{CA}$ (iv) $\overline{DF} = \overline{BA}$

EXERCISE-7.2

1. (a) SSS, as the sides of Δ ABC are equal to the sides of Δ DEF.

(b) SAS, as two sides and the angle included between these sides of Δ PQR are equal to two sides and the angle included between these sides of Δ XYZ.

(c) ASA, as two angles and the side included between these angles of Δ LMN are equal to two angles and the side included between these angles of Δ GFH.

(d) RHS, as in the given two right-angled triangles one side and the hypotenuse are respectively equal.

2. (a) (i) AR = PE
(ii) RT = EN
(iii) AT = PN
(b) (i) RT = EN
(ii) PN = AT
(c) (i) $\angle ATR = \angle PNE$
(ii) $\angle RAT = \angle EPN$

3. (i) Given
(ii) Given
(iii) Common
(iv) SAS, as the two sides and the angles included between these sides of Δ AMP are equal two sides and the angle included between these sides of Δ AMO.

4. No, this property represents that these triangles have their respective angles of equal measure. However this gives no information about their sides. The sides of these triangles have a ratio some what different than 1:1. $\therefore$ AAA property does not prove the two triangles congruent.

5. It can be observed that,
$\angle RAT = \angle WON$
$\angle ART = \angle OWN$
AR = OW
$\therefore \Delta$ RAT $\cong \Delta$ WON (ASA)

6. (i) BC = BT (given)
TA = CA (given)
BA = BA (common)
$\therefore \Delta$ BCA $\cong \Delta$ BTA (SSS)
(ii) PQ = RS, TQ = QS, PT = RQ
$\therefore \Delta$ QRS $\cong \Delta$ TPQ

7. (i) Do it yourself on square sheet
Here Δ ABC and Δ PQR have the same area and are congruent to each other also the perimeter of both the triangles will be the same.
(ii) Draw figure do it yourself on square sheet
Here, the two triangles have the same height and base. Thus, their areas are equal. However, these triangles are not congruent to each other. Also, the perimeter of both the triangles will not be the same.

9. BC = QR

10. Given:- $\angle ABC = \angle PED$ (each 90°)
$\angle BAC = \angle DFE$

The two angles of Δ ABC are equal to the two respective angles of Δ FED. Also, the sum of all interior angles of a triangle is 180°.

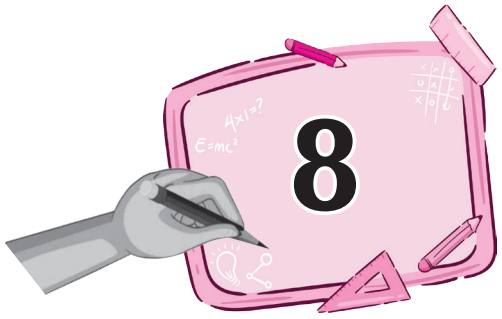
$\therefore$ Third angle of both triangles will also be equal in measure.
$\angle BCA = \angle EDF$
Also, given that $\overline{BC} = \overline{ED}$
$\therefore \Delta$ ABC $\cong \Delta$ FED (ASA)

SUBJECT ENRICHMENT EXERCISE

I. (1) They are equal in length
(2) They have equal measure
(3) $\cong$
(4) They have same radius
(5) AB = DE
(6) Δ ABC $\cong \Delta$ RQP
(7) Option (d)
(8) PR = YZ
(9) PQ = LM
(10) ASA

II. (1) PQ
(2) $\angle$Q
(3) 5.5 cm
(4) Hypotenuse
(5) Congruent, SSS

III. (1) True
(2) False
(3) True
(4) True
(5) True



8 Comparing Quantities

EXERCISE-8.1

1. (a) 7 km = 7000 m

Ratio of 500 m to 7000 m

$$500 \text{ m} : 7000 \text{ m} = \frac{5\cancel{0}\,\cancel{0}}{70\,\cancel{0}\,\cancel{0}} = \frac{\cancel{5}}{\cancel{70}_{14}} = \frac{1}{14} = 1 : 4$$

(b) 1 day = 24 × 60 = 1440 min

Ratio of 420 min to 1440 min = 420 min : 1440 min

$$= \frac{\cancel{42}^{7}\,\cancel{0}}{\cancel{144}_{72}\,\cancel{0}} = \frac{7}{24} = 7 : 24$$

(c) 75 days to one year

1 year = 365 days

Ratio of 75 days and 365 days = 75 days : 365 days

$$= \frac{\cancel{75}^{25}}{\cancel{365}_{73}} = \frac{25}{73} = 25 : 73$$

(d) Ratio of ₹ 700 to ₹ 350 $= \frac{\cancel{70}^{2}\,\cancel{0}}{\cancel{35}_{1}\,\cancel{0}} = \frac{2}{1} = 2 : 1$

(e) 1 l = 1000 ml

Ratio of 2500 ml to 1000 ml $= \frac{\cancel{25}^{5}\,\cancel{0}\,\cancel{0}}{\cancel{10}_{2}\,\cancel{0}\,\cancel{0}} = \frac{5}{2} = 5 : 2$

(f) 20 hrs = 20 × 60 = 1200 minutes

Ratio of 1200 min to 300 min $= \frac{\cancel{12}^{4}\,\cancel{00}}{\cancel{3}_{1}\,\cancel{00}} = \frac{4}{1} = 4 : 1$

2. Quantity of wheat = 760 quintal

Quantity of rice = 900 quintal

Ratio of wheat to rice = $\frac{\cancel{76}^{38}}{\cancel{90}_{45}} = \frac{38}{45} = 38 : 45$

Ratio of rice to wheat = $\frac{\cancel{90}^{45}}{\cancel{76}_{38}} = \frac{45}{38} = 45 : 38$

3. Number of cows = 650

Number of buffaloes = 800

Number of goats = 350

Ratio of cows to buffaloes = $\frac{\cancel{65}^{13}}{\cancel{80}_{16}} = \frac{13}{16} = 13 : 16$

Ratio of buffaloes to goats = $\frac{\cancel{80}^{16}}{\cancel{35}_{7}} = \frac{16}{7} = 16 : 7$

4. Let the number are = 10x and 7x

$10x - 7x = 147$

$3x = 147$

$x = \frac{\cancel{147}^{49}}{\cancel{3}_{1}} = 49$

So, the number are $10 \times 49 = 490$

$7 \times 49 = 343$

5. Let the number of toffees have Shantanu and Srijan = 9x and 5x

A.T.Q

$9x - 60 = 5x$

$9x - 5x = 60$

$4x = 60$

$x = \frac{\cancel{60}^{15}}{\cancel{4}} = 15$

Shantanu have toffee in the beginning = $9x = 9 \times 15 = 135$

Srijan have toffee in the beginning = $5x = 5 \times 15 = 75$

6. Cost of 25 sharpness = ₹ 112.50

Cost of 25 sharpness = $\frac{₹\,112.50}{25} = ₹\,4.50$

The cost of one sharpness = ₹ (4.5) = ₹ 4.50

7. Mean proportion between 2 and 8

$2 \times 8 = 16$

$\sqrt{16} = 4$

Hence, mean proportion of 2 and 8 = 4

8. $\frac{\overset{28}{\cancel{56}}}{\underset{47}{\cancel{94}}} = \frac{28}{47} = \frac{\overset{28}{\cancel{84}}}{\underset{47}{\cancel{141}}}$

So, $\frac{28}{47} = \frac{28}{47} = \frac{28}{47}$

$\therefore$ All these ratios are equivalent.

9. Time taken by train to covered 120 km distance = 1 hr 30 min = 90 min

Time taken by train to covered 1 km distance = $\frac{90 \text{ min}}{120 \text{ km}}$

Time taken by train to covered 280 km distance $= \frac{\overset{30}{\cancel{90}}}{\underset{\underset{1}{\cancel{3}}}{\underset{\cancel{6}}{\cancel{120}}}} \times \overset{7}{\cancel{14}}\cancel{28}\cancel{0}$

$= 210 \text{ min} = \frac{210}{60} \text{ hrs} = 3 \text{ hr } 30 \text{ min}$

10. $\frac{13\cancel{0}}{15\cancel{0}} = \frac{\overset{13}{\cancel{65}}}{\underset{14}{\cancel{70}}}$

$\frac{13}{15} \neq \frac{13}{14}$

$\therefore$ The two ratios are not equivalent.

11. The cost of one box = ₹ 354

1 box contains Apples = 30

$\therefore$ The cost of 30 Apples = ₹ 354

The cost of 1 Apples $= ₹\left(\frac{354}{30}\right) = ₹ 11.80$

12. Let the distance be x

1:1,00,000 = 2.5 cm : x

x = 100000 × 2.5

= 2500000 = 250000 cm = $\frac{25\cancel{0000}}{10\cancel{0000}}$

x = 2.5 km

Hence, 2.5 km Jatinder's house is away from the school.

13. The wages of one people $= ₹\frac{7175\cancel{0}}{35\cancel{0}} = ₹ 205$

If factory paid rupees 92250 the number of people work = $\frac{92250}{205} = 450$

450 people works that day.

14. Let the number be $5x$ and $3x$

Their LCM = $15x$

A.T.Q

$15x$ = 135

$x = \frac{\overset{9}{\cancel{135}}}{\underset{1}{\cancel{15}}} = 9$

$\therefore$ The number are $5x = 5 \times 9 = 45$

and $3x = 3 \times 9 = 27$

15. Manure used for 250 trees = 2350 kg

Manure used for 1 trees = $\frac{2350}{250}$ kg

Manure used for 1000 tress = $\frac{\overset{47}{\cancel{2350}}}{\underset{1}{\cancel{250}}} \times \overset{200}{\cancel{1000}} = 9400$ kg

16. The cost of 26 m of ribbon = ₹ 312

The cost of 1 m of ribbon = ₹ $\frac{\overset{12}{\cancel{312}}}{\underset{1}{\cancel{26}}}$ = ₹ 12

The cost of 70 m of ribbon = ₹ 12 × 70 = ₹ 840

17. Number of bananas in 2.4 kg = 1 dozen = 12

Number of bananas in 1 kg = $\frac{12}{2.4}$

Number of bananas in 10.2 kg = $\frac{\overset{1}{\cancel{12}}}{\underset{2}{\cancel{24}}} \times \frac{\overset{51}{\cancel{102}}}{\cancel{10}} \times \cancel{10} = 51$

18. Number of birds, produce 750 eggs = 1000 birds

Number of birds produce 1 eggs = $\frac{1000}{750}$

Number of birds produce 4500 eggs = $\frac{1000}{\underset{1}{\cancel{75}\cancel{0}}} \times \overset{6}{\cancel{450}}\cancel{0} = 6000$ birds

EXERCISE-8.2

1. (a) $7\% = \frac{7}{100} = \frac{7}{100}$

(b) $120\% = \frac{\overset{6}{\cancel{12}\cancel{0}}}{\underset{5}{\cancel{10}\cancel{0}}} = \frac{6}{5} = 1\frac{1}{5}$

(c) $70\% = \frac{7\cancel{0}}{10\cancel{0}} = \frac{7}{10}$

(d) $16\frac{2}{3}\% = \frac{50}{3}\% = \frac{\overset{1}{\cancel{5}\cancel{0}}}{\underset{6}{\cancel{30}\cancel{0}}} = \frac{1}{6}$

(e) $33\frac{1}{3}\% = \frac{100}{3}\% = \frac{\cancel{100}}{3\cancel{00}} = \frac{1}{3}$

2. (a) $\left(\frac{1}{5} \times 100\right)\% = 20\%$

(b) $\left(\frac{4}{\cancel{5}} \times \overset{20}{\cancel{100}}\right)\% = 80\%$

(c) $\left(\frac{3}{\cancel{4}_{1}} \times \cancel{100}^{25}\right)\% = 75\%$

(d) $\left(\frac{1}{\cancel{4}\,\cancel{0}_{2}} \times \cancel{10}\,\cancel{0}^{5}\right)\% = 2.5\%$

(e) $\left(\frac{7}{\cancel{25}_{1}} \times \cancel{100}^{4}\right)\% = 28\%$

3. (a) $65\% = \frac{\cancel{65}^{13}}{\cancel{100}_{20}} = \frac{13}{20}$

(b) $7.2\% = \frac{\cancel{72}^{\cancel{36}^{\cancel{18}^{9}}}}{\cancel{1000}_{\cancel{500}_{\cancel{250}_{125}}}} = \frac{9}{125}$

(c) $115\% = \frac{\cancel{115}^{23}}{\cancel{100}_{20}} = \frac{23}{20} = 1\frac{3}{20}$

(d) $45\% = \frac{\cancel{45}^{9}}{\cancel{100}_{20}} = \frac{9}{20}$

(e) $2.5\% = \frac{\cancel{25}^{1}}{\cancel{1000}_{40}} = \frac{1}{40}$

4. (a) $12\% = \frac{12}{100} = 0.12$

(b) $64\% = \frac{64}{1000} = 0.064$

(c) $125\% = \frac{125}{100} = 1.25$

(d) $15\frac{1}{2}\% = \frac{31}{200} = 0.155$

(e) $9\frac{1}{4}\% = \frac{37}{400} = 0.0925$

5. (a) $2.25 = \left(\frac{225}{100} \times 100\right)\% = 225\%$

(b) $\frac{15}{2} = \left(\frac{15}{\cancel{2}} \times \cancel{100}^{50}\right)\% = 750\%$

(c) $0.825 = \left(\frac{825}{10\cancel{0}\,\cancel{0}} \times 1\cancel{0}\,\cancel{0}\right)\% = 82.5\%$

(d) $9\frac{1}{5} = \left(\frac{46}{\cancel{5}_{1}} \times \cancel{100}^{20}\right)\% = 920\%$

(e) $3.025 = \left(\frac{3025}{10\cancel{0}\,\cancel{0}} \times 1\cancel{0}\,\cancel{0}\right)\% = 302.5\%$

(f) $\frac{92}{25} = \left(\frac{92}{\cancel{25}_{1}} \times \cancel{100}^{4}\right)\% = 368\%$

(g) $5.4 = \left(\frac{54}{1\cancel{0}} \times 10\cancel{0}\right)\% = 540\%$

(h) $0.07 = \left(\frac{007}{\cancel{100}} \times \cancel{100}\right)\% = 7\%$

(i) $0.05 = \left(\frac{005}{100} \times 100\right)\% = 5\%$

(j) $\frac{7}{50} = \left(\frac{7}{\cancel{50}} \times \cancel{100}^{2}\right)\% = 14\%$

6. (a) $3 : 2 = \left(\frac{3}{\cancel{2}_{1}} \times \cancel{100}^{50}\right)\% = 150\%$

(b) $7 : 3 = \left(\frac{7}{3} \times 100\right)\% = \frac{700}{3}\% = 233.33\%$

(c) $11 : 9 = \left(\frac{11}{9} \times 100\right)\% = \frac{1100}{9}\% = 122.22\%$

(d) $1 : 4 = \left(\frac{1}{\cancel{4}} \times \cancel{100}^{25}\right)\% = 25\%$

(e) $13 : 20 = \left(\frac{13}{\cancel{20}_{1}} \times \cancel{10\,0}^{5}\right)\% = 65\%$

7. (a) Total runs scored by Satish = 75 + 50 = 125

Percentage of runs = $\left(\frac{125}{100} \times 100\right)\% = 125\%$

(b) Total runs scored by Ashok = 25 + 55 = 80

Percentage of runs = $\left(\frac{80}{100} \times 100\right)\% = 80\%$

(c) Total runs scored by Suveer = 20 + 40 = 60

Percentage of runs = $\left(\frac{60}{100} \times 100\right)\% = 60\%$

(d) Total runs scored by Ashish = 50 + 75 = 125

Percentage of runs = $\left(\frac{125}{100} \times 100\right)\% = 125\%$

(e) Total runs scored by Arvind = 45 + 25 = 70

Percentage of runs = $\left(\frac{70}{\cancel{100}} \times \cancel{100}\right)\% = 70\%$

8. (a) 10% of ₹ 600

$\frac{1\cancel{0}}{1\cancel{0}\,\cancel{0}} \times 60\cancel{0} = ₹\ 60$

(b) 20% of 800 m

$\frac{2\cancel{0}}{1\cancel{0}\,\cancel{0}} \times 80\cancel{0} = 160\text{ m}$

(c) 8% of 200 km

$\frac{8}{\cancel{100}} \times \cancel{200}^{2} = 16\text{ km}$

(d) 40% of 200 apples

$\frac{40}{\cancel{100}} \times \cancel{200}^{2} = 80\text{ apples}$

(e) 10% of 500

$\frac{10}{\cancel{100}} \times 5\cancel{00} = 50$

(f) 20% of ₹ 1000

$\frac{20}{\cancel{100}} \times 10\cancel{00} = ₹\ 200$

(g) 90% of ₹ 4.40

$\frac{9\cancel{0}}{1\cancel{0}\,\cancel{0}} \times \frac{440}{100} = \frac{396}{100} = ₹\ 3.96$

(h) 50% of 36

$\frac{5\cancel{0}}{\cancel{10}\,\cancel{0}_{1}} \times \cancel{36}^{18} = 18$

9. (a) Let the whole journey = x km

10% of x = 72 km

$\frac{10}{100} \times x = 72$

$x = \frac{72 \times 10\cancel{0}}{10\cancel{0}} = 720\text{ km}$

(b) Let the amount of sale = x

A.T.Q

5% sales tax on a sale = ₹ 4

$$\frac{5}{100} \times x = ₹\ 4$$

$$x = \frac{4 \times \cancel{100}^{20}}{\cancel{5}_{1}} = ₹\ 80$$

(c) Let the original cost of the shirt = x

Increase in the cost of shirt = Rs 120

A.T.Q

$$\frac{20}{100} \times x = 120$$

$$x = \frac{120 \times \cancel{100}^{5}}{\cancel{20}} = ₹\ 600$$

(d) Let the sum invested = ₹ x

A.T.Q

$$\frac{16 \times x}{100} = 434$$

$$x = \frac{\cancel{434}^{217} \times \cancel{100}^{\cancel{50}^{25}}}{\cancel{16}_{\cancel{8}_{\cancel{4}_{2}}}} = \frac{5425}{2} = \text{Rs } 2712.50$$

(e) Let the original price = ₹ x

$$\frac{40}{100} \times x = ₹\ 400$$

$$x = ₹ \left(\frac{\cancel{400}^{100} \times 10\cancel{0}}{\cancel{4}\ \cancel{0}_{1}} \right) = ₹\ 1000$$

10. (a) $\frac{\cancel{2}\ \cancel{0}}{\cancel{6}\ \cancel{0}_{3}} \times 100\% = 33.33\%$

(b) $\frac{\cancel{9}^{1}\ \cancel{0}}{\cancel{36}\ \cancel{0}_{3}} \times 100\% = 25\%$

(c) 25 cm, 100 cm

$$\frac{25}{\cancel{100}} \times \cancel{100}\,\% = 25\%$$

(d) $\left(\frac{3.6\ \text{kg}}{7.2\ \text{kg}} \times 100 \right)\% = 50\%$

EXERCISE-8.3

1. Let x be the marks obtained in maths

Total marks obtained in all the three subjects = 60 + 50 + x = 110 + x

Total marks = 300

Percentage obtained in all the three subjects = 60%

Marks obtained math = $\frac{110 + x}{300} = \frac{60}{100}$

$$110 + x = \frac{60 \times \overset{3}{\cancel{300}}}{\cancel{100}}$$

$$110 + x = 180$$

$$x = 70$$

Hence, the marks in maths = 70

2. House rent = 25% of salary $= \frac{25}{\cancel{100}} \times 360\cancel{00} = 25 \times 360 = ₹\ 9000$

Let percentage of food item = x%

$\frac{x}{100} \times 36000 =$ Rs 7200

$$x = \frac{\overset{20}{\cancel{720\,0}} \times \cancel{100}}{\underset{1}{\cancel{36\,000}}} = 20\%$$

3. Let the total votes = x

Ashish gots votes = 12000

40% of x = 12000

$$x = \frac{\overset{3000}{\cancel{12000}} \times 10\cancel{0}}{\underset{1}{\cancel{4\,0}}} = 30000$$

Hence, the total number of votes = 30,000

Ashok gots 25% of the votes

$\frac{25}{\cancel{100}} \times 300\cancel{00} = 7500$

(a) Total votes of Ashok and Ashish is 12000 + 7500 = 19500

(b) Voters who did not vote = 30000 – 19500 = 10500

4. Hindi = 40% = 40 marks

English = 60% = 60 marks

Maths = 90% = 90 marks

Full mark of each subject = 100

Total marks = 300

So, total% $= \left(\frac{40 + 60 + 90}{300}\right) \times 100$

$$= \frac{190}{3\cancel{00}} \times \cancel{100} = \frac{190}{3}\% = 63.33\%$$

5. Percentage of children = (100% – 50% – 25%) = 25%

Number of children = 25000

Let the total population = x

Number of children = 25% of population

$$25000 = \frac{25}{100} \times x$$

$$x = \frac{\overset{1000}{\cancel{25000}} \times 100}{\underset{1}{\cancel{25}}} = 1{,}00{,}000$$

Total population = 1,00,000

6. Rent = ₹ 3500 per day

Luxury = 8% on the room rent

$$\frac{8}{\cancel{100}} \times 35\cancel{00} = 280$$

Total rent per day = ₹ (3500 + 280) = ₹ 3780

Rent for 2 days = ₹ (3780 × 2) = ₹ 7560

7. Percentage of Nickel = 100% – 20% – 40% = 40%

Alloy = 40 kg

Amount of nickel in 40 kg of the alloy $= \frac{4\cancel{0}}{\cancel{10}\,\cancel{0}} \times 4\cancel{0} = 16$ kg

8. Increase in population = 75000 – 50000 = 25000

Increase in % of the population $= \frac{25\cancel{000}}{\underset{1}{\cancel{5}}\,\cancel{0}\,\cancel{000}} \times \overset{2}{\cancel{10}}\,\cancel{0} = 50\%$

9. Decrease in the cost of house = 400000 – 250000 = 150000

Decrease in % of the cost of house $= \frac{15\cancel{0000}}{\underset{2}{\cancel{4}}\,\cancel{0}\,\cancel{0000}} \times \overset{5}{\cancel{10}}\,\cancel{0}\% = \frac{75}{2}\% = 37.5\%$

10. Total number of seats = 2000

Number of seats in balcony $= \frac{2\cancel{0}}{\cancel{10}\,\cancel{0}} \times 200\cancel{0} = 400$

Collection from balcony when houseful = 400 × 200 = ₹ 80,000

Number of seats in rear stall = 50% of 2000 $= \frac{50}{\cancel{100}} \times 20\cancel{00} = 1000$

Collection from rear stall when houseful = 1000 × ₹ 50 = ₹ 50,000

Number of seats in front stall = (100 – 20 – 50)% = 30% of 2000

$= \frac{30}{\cancel{100}} \times 20\cancel{00} = 600$

Collection from front stall when houseful = 600 × ₹ 25 = ₹ 15,000

Total collection when houseful = ₹ (80,000 + 50,000 + 15000) = ₹ 1,45,000

EXERCISE-8.4

1. (a) C.P. of shirt = ₹ 400

S.P. of shirt = ₹ 500

C.P. < S.P.

∴ Profit = S.P. – C.P. = ₹ (500 – 400) = ₹ 100

$$P\% = \frac{P}{C.P.} \times 100\% = \frac{\overset{25}{\cancel{100}}}{\underset{1}{\cancel{400}}} \times \cancel{100} = 25\%$$

(b) C.P. = ₹ 50

S.P. = ₹ 60

Profit = ₹ (60 – 50) = ₹ 10

$$P\% = \frac{P}{C.P.} \times 100\% = \left(\frac{10}{\cancel{50}} \times \overset{2}{\cancel{100}}\right)\% = 20\%$$

(c) C.P. = ₹ 40,000

S.P. = ₹ 45,050

P = S.P. – C.P. = ₹ (45050 – 40000) = ₹ 5,050

$$P\% = \frac{P}{C.P.} \times 100\% = \frac{\overset{101}{\cancel{5050}}}{\underset{8}{\cancel{4000}}} \times \cancel{100} = 12.625\%$$

(d) C.P. = ₹ 25,00,000

S.P. = ₹ 50,00,000

P = ₹ (50,00,000 – 25,00,000) = ₹ (25,00,000)

$$P\% = \left(\frac{25,00,000}{25,00,000} \times 100\right)\%$$

$$P\% = 100\%$$

2. (a) S.P. = C.P. + P

$$P\% = \frac{P\%}{100} \times C.P.$$

$$P = \frac{\cancel{10}}{\cancel{100}} \times 1500\cancel{0} = \text{Rs } 1500$$

S.P. = ₹ (15,000 + 1,500) = ₹ 16.500

(b) $$\text{Loss}\% = \frac{L\%}{100} \times C.P.$$

$$= \frac{\cancel{10}}{\cancel{100}} \times 1,40,50\cancel{0} = ₹\,14,050$$

S.P. = C.P. – Loss

= ₹ (1,40,500 – 14,050) = ₹ 1,26,450

(c) $$\text{Loss} = \frac{15}{\cancel{100}} \times 250\cancel{00} = ₹\,3750$$

S.P. = C.P. – Loss

= ₹ (25,000 – 3,750) = ₹ 21,250

(d) $\text{Profit} = \frac{8}{\cancel{100}} \times \cancel{500}00 = ₹\ 4000$

S.P. = C.P. + Profit

= ₹ (50000 + 4000) = ₹ 54,000

(e) $\text{Profit} = \frac{2\cancel{0}}{\cancel{10}\cancel{0}} \times 4500\cancel{0} = ₹\ 9000$

S.P. = C.P. + Profit

= ₹ (45,000 + 9,000) = ₹ 54,000

3. (a) $\text{Profit} = \frac{P\%}{100} \times \text{C.P.} = \frac{\overset{1}{\cancel{20}}}{\underset{5}{\cancel{100}}} \times \text{C.P.} = \frac{1}{5} \times \text{C.P.}$

Let the C.P. of study table = Rs x

Then P = $\frac{1}{5}$ of C.P. = ₹ $\frac{x}{5}$

S.P. = C.P. + P

$₹\ 15000 = x + \frac{x}{5}$

$₹\ 15000 = \frac{5x + x}{5}$

$₹\ 15000 = \frac{6x}{5}$

$x = \overset{2500}{\cancel{15000}} \times \frac{5}{\cancel{6}_{\cancel{3}_{1}}} = ₹\ 12500$

∴ C.P. = ₹ 12,500

(b) Let the C.P. of T.V. = ₹ x

Loss = 15% of x

$\frac{15}{100} \times x = \frac{15x}{100}$

S.P. = C.P. – Loss

$₹\ 8000 = ₹ \left(x - \frac{15x}{100} \right)$

$8000 = \frac{85x}{100}$

$x = 8000 \times \frac{\overset{20}{\cancel{100}}}{\underset{17}{\cancel{85}}} = \frac{₹\ 160000}{17} = ₹\ 9411.76$

(c) Let C.P. = ₹ x

Loss = 13% of $x = \frac{13}{100}x$

S.P. = C.P. – Loss

$$₹\ 42800 = x - \frac{13}{100}x$$

$$₹\ 42800 = \frac{100x - 13x}{100}$$

$$₹\ 42,800 = \frac{87x}{100}$$

$$x = \frac{42800 \times 100}{87} = ₹\ 49195.40$$

(d) Let CP = ₹ x

Profit = 12% of $x = \frac{\cancel{12}^{3}}{\cancel{100}_{25}} \times x = \frac{3x}{25}$

S.P. = C.P. + P

$$16000 = ₹\ x + \frac{3x}{25}$$

$$16000 = \frac{28x}{25}$$

$$x = \frac{16000 \times 25}{28} = ₹\ 14285.71$$

4. Let CP of each T.V. = ₹ x

Profit on I T.V. = 20% of CP = $\frac{2\cancel{0}}{10\cancel{0}} \times x = \frac{2x}{10}$

Profit on II T.V. = 10% of CP = $\frac{1\cancel{0}}{10\cancel{0}} \times x = \frac{x}{10}$

S.P. of I T.V. = CP + P = $x + \frac{2x}{10} = ₹\ \frac{12x}{10}$

S.P. of II T.V. = CP + P = $x + \frac{x}{10} = ₹\ \frac{11x}{10}$

If the difference in the SP of the two TVs = ₹ 1500

$$\frac{12x}{10} - \frac{11x}{10} = ₹\ 1500$$

$$\frac{x}{10} = 1500$$

$$x = 1500 \times 10 = ₹\ 15,000$$

∴ The CP of each TV was ₹ 15000

5. Let CP of each pencil = x

CP of 10 pencil = $10x$

CP of 11 pencil = $11x$

SP of 10 pen = C.P. of 11 pencils

SP of 10 pen = $11x$

CP of 10 pen = $10x$

SP > CP

Profit = $11x - 10x$ = ₹ x

$$\text{Profit} = \left(\frac{P}{C.P.} \times 100\right)\% = \left(\frac{\cancel{x}}{\cancel{10x}} \times \cancel{100}\right)\% = 10\%$$

$$P = 10\%$$

6. Let the cost price of shirt = ₹ x

$$\text{Loss} = 20\% \text{ of CP} = \frac{20}{100} \times x = \frac{x}{5}$$

$$SP = CP - L \Rightarrow 900 = x - \frac{x}{5}$$

$$\Rightarrow 900 = \frac{4x}{5}$$

$$\Rightarrow x = \frac{\cancel{900}^{225} \times 5}{\cancel{4}_{1}} = ₹1125$$

$\therefore$ The CP of shirt = ₹ 1125

7. Let the CP of an article = ₹ x

If he sells on 5% loss

$$\text{Loss} = \frac{\cancel{5}^{1}}{\cancel{100}_{20}} \times x$$

$$\text{Loss} = \frac{x}{20}$$

$$SP = CP - \text{Loss}$$

$$₹\,570 = x - \frac{x}{20}$$

$$₹\,570 = \frac{19x}{20}$$

$$x = \frac{\cancel{570}^{30} \times 20}{\cancel{19}_{1}} = ₹\ 600$$

EXERCISE-8.5

1. (a) P = Rs 1500, R = 12%, T = 2 years

$$\text{S.I.} = \frac{P \times R \times T}{100} = \frac{\cancel{1500} \times 12 \times 2}{\cancel{100}} = ₹\,360$$

Amount = P + I

Amount = ₹ (1500 + 360) = ₹ 1860

(b) P = ₹ 500, R = 12%, T = 4 years

$$\text{S.I.} = \frac{P \times R \times T}{100} = \frac{\overset{5}{\cancel{500}} \times 12 \times 4}{\cancel{100}} = \text{Rs } 240$$

Amount = P + I

Amount = ₹ (500 + 240) = ₹ 740

(c) P = ₹ 3000, R = 10%, T = 2 years

$$\text{S.I.} = \frac{P \times R \times T}{100} = \frac{3000 \times 10 \times 2}{\cancel{100}} = \text{Rs } 600$$

Amount = P + I

Amount = ₹ (3000 + 600) = ₹ 3600

2. Let the sum = ₹ x,

R = 8%, T = 4 years

$$I = \frac{P \times R \times T}{100} = \frac{x \times 8 \times 4}{100} = \frac{32x}{100}$$

If R = 6%, T = 4 years and P = ₹ x

$$\text{S.I.} = \frac{P \times R \times T}{100} = \frac{x \times 6 \times 4}{100} = \frac{24x}{100}$$

A.T.Q

$$\frac{32x}{100} = \frac{24x}{100} + 56$$

$$\frac{32x}{100} - \frac{24x}{100} = 56$$

$$\frac{8x}{100} = 56$$

$$x = \frac{\overset{7}{\cancel{56}} \times 100}{\underset{1}{\cancel{8}}} = ₹\,700$$

Hence, the sum = ₹ 700

3. (a) P = ₹ 5,40,000, R = 13% p.a., T = 5 years

$$I = \frac{P \times R \times T}{100} = \frac{5400\cancel{00} \times 13 \times 5}{\cancel{100}} = ₹\,3,51,000$$

A = P + I = ₹ (5,40,000 + 3,51,000) = ₹ 8,91,000

∴ ₹ 8,91,000 Nitin was repay the finance company.

(b) Total amount paid after 5 years = ₹ 891000

Total time period = 5 years = 60 months

$$\text{Amount paid per month} = \frac{\text{total amount}}{\text{total time}} = \frac{891000}{60} = ₹\,14,850$$

4. P = ₹ 500000, R = 12%, T = 1 months = $\frac{1}{12}$ years

$$\text{S.I.} = \frac{P \times R \times T}{100} = \frac{500000 \times \overset{1}{\cancel{12}} \times 1}{100 \times \underset{1}{\cancel{12}}} = \text{Rs } 5000$$

Hence, his monthly interest earned = ₹ 5000

5. Let P = ₹ x

Time = n years

R = 8% p.a.

Amount = ₹ $2x$

A = P + I

$2x = x + I$

$I = 2x - x = x$

$$I = \frac{P \times R \times T}{100} = \frac{x \times 8 \times n}{100}$$

$$x = \frac{x \times 8n}{100}$$

$$100x = x \times 8n$$

$$n = \frac{\overset{25}{\cancel{50}}\cancel{100}\ \cancel{x}}{\cancel{x} \times \underset{2}{\cancel{8}}} = 12.5 \text{ years}$$

6. Fixed deposit of Deepti (P) = ₹ 26000

R = 8%

T = 2 year

$$\text{S.I.} = \frac{P \times T \times R}{100} = \frac{260\cancel{00} \times 2 \times 8}{1\cancel{00}} = \text{Rs } 4160$$

∴ SI for two year = ₹ 4160

Amount for 2 year she gets = P + I

A = ₹ (26000 + 4160) = ₹ 30160

∴ She will get ₹ 30160 after 2 years

7. Amount = P + I

₹ 9920 = ₹ 6200 + I

I = Rs (9920 – 6200) = ₹ 3720

$$I = \frac{P \times R \times T}{100} = 3720 = \frac{6200 \times r \times 4}{100} = \frac{3720 \times 1\cancel{00}}{62\cancel{00} \times 4} = \frac{3720}{248} = 15\%$$

NCERT CORNER

EXERCISE-8.1

1. (a) ₹ 5 = 500 paise

$$\text{Ratio 500 p to 50 paise} = \frac{\overset{10}{\cancel{50}\ \cancel{0}}}{\underset{1}{\cancel{5}\ \cancel{0}}} = 10 : 1$$

(b) 15 kg = 15000 g

Ratio 15000 g to 210 g = $\frac{\cancel{1500\,0}^{500}}{\cancel{21\,0}_{7}} = \frac{500}{7} = 500 : 7$

(c) 9 m = 900 cm

Ratio of 900 cm to 27 cm = $\frac{\cancel{900}^{100}}{\cancel{27}_{3}} = 100 : 3$

(d) 30 days = 30 × 24 hrs = 720 hrs

Ratio of 720 hours to 36 hrs = $\frac{\cancel{720}^{20}}{\cancel{36}_{1}} = 20 : 1$

2. For 6 students, no of computers required = 3

For 1 student, number of computers required = $\frac{3}{6}$

24 student, number of computers required = $\frac{3}{\cancel{6}_{1}} \times \cancel{24}^{4} = 12$ computers

3. (i) Population of Rajasthan in 3 km^2 area = 570 lakh

Population of Rajasthan in 1 km^2 area = $\frac{570}{3} = 90$ lakh

Population in UP in 2 km^2 area = 1660 lakh

Population in UP in 1km^2 area = $\frac{1660}{2} = 830$ lakh

(ii) Rajasthan is less populated because we can be observed that population per km^2 area is lesser for Rajasthan.

EXERCISE-8.2

1. (a) $\frac{1}{8} \times 100\% = 12.5\%$

(b) $\left(\frac{5}{\cancel{4}} \times \cancel{100}^{25}\right)\% = 125\%$

(c) $\left(\frac{3}{\cancel{4\,0}_{2}} \times \cancel{100}^{25}\right)\% = \frac{15}{2}\% = 7.5\%$

(d) $\left(\frac{2}{7} \times 100\right)\% = \left(\frac{200}{7}\right)\% = 28\frac{4}{7}\%$

2. (a) $0.65 = \left(\frac{0.65}{100} \times 100\right)\% = 65\%$

(b) $2.1 = \left(\frac{21}{10} \times 100\right)\% = 210\%$

(c) $0.02 = \left(\frac{002}{100} \times 100\right)\% = 2\%$

(d) $12.35 = \left(\frac{1235}{100} \times 100\right)\% = 1235\%$

3. (i) Here, 1 part out of 4 equal parts are shaded which represents the fraction = $\frac{1}{4}$

$\frac{1}{4} \times 100\% = 25\%$

(ii) Fraction $= \frac{3}{5} = \frac{3}{\cancel{5}_{1}} \times \cancel{100}^{20} = 60\%$

(iii) Fraction $= \frac{3}{8}$

$\left(\frac{3}{8} \times 100\right)\% = \frac{300}{8}\% = 37.5\%$

4. (a) 15% of 250

$\frac{15}{\cancel{10}\,\cancel{0}_{2}} \times \cancel{25}^{5}\,\cancel{0} = \frac{75}{2} = 37.5$

(b) 1% of 1 hour

1 hour = 60 min

1% of 60 min $= \frac{1}{\cancel{10}\,\cancel{0}_{5}} \times \cancel{6}^{3}\,\cancel{0} = \frac{3}{5}$ minutes

(c) 20% of ₹ 2500

$\frac{2\cancel{0}}{1\cancel{0}\,\cancel{0}} \times 250\cancel{0} =$ ₹ 500

(d) 75% of 1 kg

$\frac{75}{1\cancel{00}} \times 10\cancel{00}$ g $= 750$ g

5. Let the whole quantity = x

(a) 5% of $x = 600$

$\frac{5}{100} \times x = 600$

$x = \frac{\cancel{600}^{120} \times 100}{\cancel{5}_{1}} = 12000$

(b) 12% of $x =$ ₹ 1080

$\frac{12}{100} \times x = 1080$

$x = \frac{\cancel{1080}^{90} \times 100}{\cancel{12}_{1}} =$ ₹ 9000

(c) 40% of $x = 500$ km

$\frac{40}{100} \times x = 500$

$x = \frac{\cancel{500}^{250} \times \cancel{10}^{5}\,\cancel{0}}{\cancel{4}\,\cancel{0}_{2_{1}}} = 1250$ km

(d) 70% of x = 14 min

$$x = \frac{\overset{2}{\cancel{14}} \times 10\cancel{0}}{\underset{1}{\cancel{7}}\ \cancel{0}} = 20 \text{ min}$$

(e) 8% of x = 40 l

$$\frac{8}{100} \times x = 40 \text{ l}$$

$$x = \frac{\overset{5}{\cancel{40}} \times 100}{\underset{1}{\cancel{8}}} = 500 \text{ l}$$

6. (a) $25\% = \frac{25}{100} = \frac{1}{4} = 0.25$

(b) $150\% = \frac{\overset{3}{\cancel{150}}}{\underset{2}{\cancel{100}}} = \frac{3}{2} = 1.5$

(c) $20\% = \frac{\overset{1}{\cancel{2}}\ \cancel{0}}{\underset{5}{\cancel{10}}\ \cancel{0}} = \frac{1}{5} = 0.20$

(d) $5\% = \frac{\overset{1}{\cancel{5}}}{\underset{20}{\cancel{100}}} = \frac{1}{20} = 0.05$

7. It is given that 30% are females and 40% are males
Children (100 – 30 – 40)% = 30%

8. Percentage of votes who voted = 60%
Percentage of those who did not vote = 100% – 60% = 40%

Number of people who did not vote $= \frac{40}{\cancel{100}} \times 150\cancel{00}$

$= 6000$

∴ 6000 people did not vote.

9. Let Meera's salary = ₹ x
10% of x = ₹ 4000

$$\frac{10}{100} \times x = ₹\ 4000$$

$$x = \frac{4000 \times 10\cancel{0}}{\cancel{10}} = ₹\ 40{,}000$$

10. Number of games won = 25% of 20

$$\frac{\overset{5}{\cancel{25}}}{\underset{5}{\cancel{100}}} \times \cancel{20} = 5 \text{ matches}$$

∴ The team won 5 matches.

EXERCISE-8.3

1. (a) C.P. = ₹ 250
S.P. = ₹ 325
P = ₹ (325 – 250) = ₹ 75

$$P\% = \frac{P}{CP} \times 100 = \frac{\cancel{75}^{3}}{\cancel{25\,0}_{1}} \times 10\cancel{0} = 30\%$$

(b) C.P. = ₹ 12000
S.P. = ₹ 13500
P = ₹ (13500 – 12000) = ₹ 1500

$$P\% = \frac{P}{CP} \times 100 = \left(\frac{\cancel{150\,0}^{12.5}}{\cancel{12\,0\,00}_{1}} \times \cancel{100} \right) = 12.5\%$$

(c) C.P. = ₹ 2500
S.P. = ₹ 3000
P = S.P. – C.P. = ₹ (3000 – 2500) = ₹ 500

$$P\% = \left(\frac{\cancel{5\,00}^{1}}{\cancel{2500}_{5}} \times \cancel{100}^{20} \right) = 20\%$$

(d) C.P. – ₹ 250
S.P. = ₹ 150
Loss = ₹ (250 – 150) = ₹ 100

$$Loss\% = \frac{Loss}{CP} \times 100 = \left(\frac{\cancel{100}^{2}}{\cancel{250}_{5}} \times \cancel{100}^{20} \right) = 40\%$$

2. (a) 3 : 1
Total parts = 3 + 1 = 4

$$\text{Ist part} = \frac{3}{4} = \frac{3}{4} \times 100\% = 75\%$$

$$\text{IInd part} = \frac{1}{4} = \left(\frac{1}{4} \times 100 \right)\% = 25\%$$

(b) 2 : 3 : 5
Total parts = 2 + 3 + 5 = 10

$$\text{Ist part} = \frac{2}{10} = \left(\frac{2}{10} \times 100 \right)\% = 20\%$$

$$\text{IInd part} = \frac{3}{10} = \left(\frac{3}{10} \times 100 \right)\% = 30\%$$

$$\text{IIIrd part} = \frac{5}{10} = \left(\frac{5}{10} \times 100 \right)\% = 50\%$$

(c) 1 : 4

Total parts = 1 + 4 = 5

Ist part = $\frac{1}{5} = \left(\frac{1}{5} \times 100\right)\% = 20\%$

IInd part = $\frac{4}{5} = 80\%$

(d) 1 : 2 : 5

Total parts = 1 + 2 + 5 = 8

I part = $\left(\frac{1}{\cancel{8}_{2}} \times \frac{\overset{25}{\cancel{50}}}{\cancel{100}}\right)\% = 12.5\%$

II part = $\left(\frac{\overset{1}{\cancel{2}}}{\cancel{8}_{4}} \times \frac{25}{\cancel{100}}\right)\% = 25\%$

III part = $\left(\frac{5}{8} \times 100\right)\% = 62.5\%$

3. Initial population = 25000

Final population = 24500

Decrease = 500

Decrease% = $\frac{\overset{2}{\cancel{500}}}{\underset{1}{\cancel{25000}}} \times \cancel{100} = 2\%$

4. Increase price = ₹ (370000 – 350000) = ₹ 20,000

Increase % = $\frac{200\cancel{00}}{35\cancel{00}\,\cancel{00}} \times \cancel{100} = \frac{\overset{40}{\cancel{200}}}{\underset{7}{\cancel{35}}} = \frac{55}{7}\%$

5. CP = ₹ 10,000

P = 20% of 10000 = $\frac{2\cancel{0}}{1\cancel{0}\,\cancel{0}} \times 1000\cancel{0} =$ ₹ 2000

SP = CP + P = ₹ 10000 + ₹ 2000 = ₹ 12000

6. SP = ₹ 13500

Let CP by washing machine = ₹ x

Loss = 20% of x

$\frac{20}{100} \times x = \frac{x}{5}$

$SP = CP - Loss$

₹ $13500 =$ ₹ $\left(x - \frac{x}{5}\right)$

$13500 = \frac{4x}{5}$

$x = \frac{\overset{3375}{\cancel{13500}} \times 5}{\underset{1}{\cancel{4}}} =$ ₹ 16875

7. (i) Ratio of calcium, carbon and oxygen = 10 : 3: 12

As 10 + 3 + 12 = 25

$\therefore$ % of carbon = $\frac{3}{\cancel{25}_{1}} \times \cancel{100}^{4} = 12\%$

(ii) Let the weight of the stick be x g

12% of x = 3

$= \frac{12}{100} \times x = 3$

$$x = \frac{\cancel{3} \times \cancel{100}^{25}}{\cancel{12}_{1}^{\cancel{4}}} = 25 \text{ g}$$

8. CP = ₹ 275

SP = ?

Loss = 15% of 275

$= \frac{15}{\cancel{100}_{4}} \times \cancel{275}^{11} = \frac{15 \times 11}{4} = \text{Rs } 41.25$

SP = CP – Loss = ₹ 275 – ₹ 41.25 = ₹ 233.75

9. (a) P = ₹ 1200, R = 12% p.a., T = 3 years

$\text{S.I.} = \frac{P \times R \times T}{100} = \frac{12\cancel{00} \times 12 \times 3}{\cancel{100}} = 144 \times 3 = ₹ 432$

A = P + I = ₹ 1200 + ₹ 432 = ₹ 1632

(b) P = ₹ 7500, R = 5% p.a., T = 3 years

$I = \frac{75\cancel{00} \times 5 \times 3}{\cancel{100}} = ₹ 1125$

A = ₹ (7500 + 1125) = ₹ 8625

10. $\text{S.I.} = \frac{P \times R \times T}{100}$

$280 = \frac{560\cancel{00} \times R \times 2}{\cancel{100}}$

$R = \frac{\cancel{280}^{140}}{560 \times \cancel{2}_{1}} = \frac{\cancel{14}^{1}\cancel{0}^{\cancel{7}}}{\cancel{56}_{\cancel{28}_{4}}\cancel{0}} = \frac{1}{4} = 0.25\%$

11. $\text{S.I.} = \frac{P \times R \times T}{100}$

$₹ 45 = \frac{P \times 9 \times 1}{100}$

$P = \frac{\cancel{45}^{5} \times 100}{\cancel{9}_{1}} = ₹ 500$

SUBJECT ENRICHMENT EXERCISE

I. (1) 2 : 5

(2) $66\frac{2}{3}\%$

(3) ₹ 510

(4) 400%

(5) $\frac{1}{25}$

(6) $\frac{9}{20}$

(7) $16\frac{2}{3}\%$

(8) 25%

(9) 10%

II. (1) Mean

(2) 50, 100, 100

(3) $8\frac{1}{3}\%$

(4) $\frac{5}{3}\%$

(5) 25%

III. (1) True

(2) False

(3) True

(4) True

(5) False

Rational Numbers

EXERCISE-9.1

1. (a) $\frac{1}{2}$ = Yes, Rational Number

(b) $\frac{3}{5}$ = Yes, Rational Number

(c) $\frac{6}{1}$ = Yes, Rational Number

(d) $\frac{0}{1}$ = Yes, Rational Number

(e) $\frac{0}{9}$ = Yes, Rational Number

(f) $\frac{3}{0}$ = No, Rational Number

2. (a) Positive rational number

(b) Positive rational number

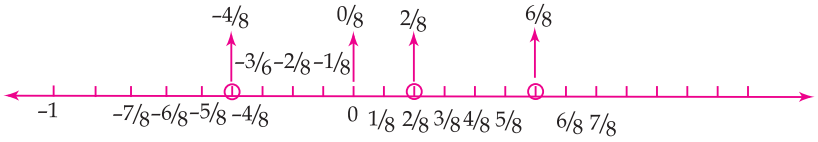
(c) Positive rational number

(d) Negative rational number

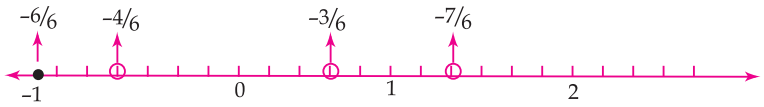
(e) Negative rational number

(f) Negative rational number

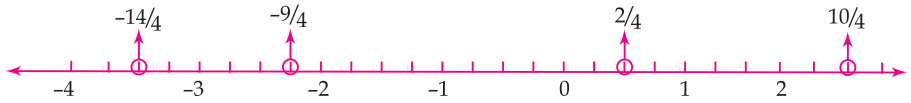
3. (a)



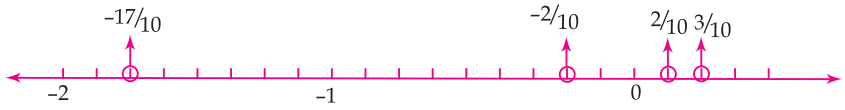
(b)



(c)



(d)



4. (a) $\frac{\cancel{44}^{4}}{\cancel{55}_{4}} = \frac{4}{5}$

(b) $\frac{\cancel{-6}^{1}}{\cancel{78}_{13}} = \frac{-1}{13}$

(c) $\frac{\cancel{35}^{1}}{\cancel{70}_{2}} = \frac{1}{2}$

(d) $\frac{\cancel{-44}^{\cancel{-22}^{-11}}}{\cancel{100}_{\cancel{50}_{25}}} = \frac{-11}{25}$

(e) $\frac{\overset{3}{\cancel{39}}}{\underset{13}{\cancel{169}}} = \frac{3}{13}$

(f) $\frac{\overset{1}{\cancel{7}}}{\underset{8}{\cancel{56}}} = \frac{1}{8}$

5. (a) $\frac{7}{8}$ Yes, this is in the simplest form.

(b) $\frac{\overset{8}{\cancel{16}}}{\underset{23}{\cancel{46}}} = \frac{8}{23}$ No, this is not in the simplest form.

(c) $\frac{19}{25}$ Yes, this is in the simplest form.

(d) $\frac{\overset{5}{\cancel{35}}}{\underset{\underset{7}{\cancel{49}}}{\cancel{98}}} = \frac{5}{7}$ No, this is not in the simplest form.

6. (a) $\frac{1}{6} = \frac{\boxed{6}}{36}$

(b) $\frac{3}{4} = \frac{\boxed{-18}}{-24}$

(c) $\frac{5}{11} = \frac{\boxed{45}}{99}$

(d) $\frac{-9}{27} = \frac{\boxed{7}}{-21}$

(e) $\frac{-9}{13} = \frac{\boxed{-27}}{39}$

(f) $\frac{1}{7} = \frac{\boxed{9}}{63}$

7. (a) $\frac{4}{9} \boxed{>} \frac{5}{13}$

$4 \times 13 = 52 \boxed{>} 5 \times 9 = 45$

(b) $\frac{24}{41} \boxed{>} \frac{13}{37}$

$24 \times 37 = 888 \boxed{>} 41 \times 13 = 533$

(c) $\frac{-7}{12} \boxed{<} \frac{-12}{21}$

$-7 \times 21 = -147 \boxed{<} -12 \times 12 = -144$

(d) $\frac{19}{41} \boxed{<} \frac{10}{19}$

$19 \times 19 = 361 \boxed{<} 41 \times 10 = 410$

(e) $\frac{+73}{81} \boxed{>} \frac{10}{13}$

$+73 \times 13 = 949 \boxed{>} 10 \times 81 = 810$

(f) $\frac{-3}{7} \boxed{<} \frac{-4}{10}$

$-3 \times 10 = -30 \boxed{<} -4 \times 7 = -28$

8. (a) $|5| = 5$

(b) $\left|\frac{-9}{5}\right| = \frac{9}{5}$

(c) $\left|\frac{-7}{4}\right| = \frac{7}{4}$

(d) $\left|\frac{5}{13}\right| = \frac{5}{13}$

(e) $|-33| = 33$

(f) $\left|\frac{-32}{48}\right| = \frac{32}{48}$

9. (a) (i) $\frac{8}{10}, \frac{6}{7}, \frac{12}{13}, \frac{-2}{4}, \frac{-4}{5}$

LCM of $4, 5, 7, 13, 10 = 1820$

$\frac{8 \times 182}{10 \times 182} = \frac{1456}{1820}, \frac{6 \times 260}{7 \times 260} = \frac{1560}{1820}$

$\frac{12 \times 140}{13 \times 140} = \frac{1680}{1820}, \frac{-2 \times 455}{4 \times 455} = \frac{-910}{1820}$

$\frac{-4 \times 364}{5 \times 364} = \frac{-1456}{1820}$

Arrange in ascending order

$\frac{-1456}{1820} < \frac{-910}{1820} < \frac{1456}{1820} < \frac{1560}{1820} < \frac{1680}{1820}$

$\therefore \frac{-4}{5} < \frac{-2}{4} < \frac{8}{10} < \frac{6}{7} < \frac{12}{13}$

(ii) $\frac{6}{9}, \frac{6}{7}, \frac{-7}{5}, \frac{12}{13}, \frac{3}{4}$

LCM of $9, 7, 5, 13$ and $4 = 16,380$

$\frac{6 \times 1820}{9 \times 1820} = \frac{10,920}{16380}$

$\frac{6 \times 2340}{7 \times 2340} = \frac{14,040}{16380}$

$\frac{-7 \times 3276}{5 \times 3276} = \frac{-22932}{16380}$

$\frac{12 \times 1260}{13 \times 1260} = \frac{15,120}{16380}$

$\frac{3 \times 4095}{4 \times 4095} = \frac{12,285}{16380}$

Arrange in ascending order

$\frac{-22932}{16380} < \frac{10920}{16380} < \frac{12285}{16380} < \frac{14040}{16380} < \frac{15120}{16380}$

$\therefore \frac{-7}{5} < \frac{6}{9} < \frac{3}{4} < \frac{12}{13} < \frac{6}{7}$

(b) (i) $\frac{8}{11}, \frac{3}{6}, \frac{12}{16}, \frac{2}{7}, \frac{18}{17}$

LCM of $6, 7, 11, 16$ and $17 = 62832$

$\frac{8 \times 5712}{11 \times 5712} = \frac{45,696}{62832}, \frac{3 \times 10472}{6 \times 10472} = \frac{31,416}{62832}$

$\frac{12 \times 3927}{16 \times 3927} = \frac{47,124}{62832}, \frac{2 \times 8976}{7 \times 8976} = \frac{17952}{62832}$

$\frac{18 \times 3696}{17 \times 3696} = \frac{66,528}{62832}$

Arrange in descending order

$\frac{66582}{62832} > \frac{47124}{62832} > \frac{45696}{62832} > \frac{31416}{62832} > \frac{17952}{62832}$

$\therefore \frac{18}{17} > \frac{12}{16} > \frac{8}{11} > \frac{3}{6} > \frac{2}{7}$

(ii) $\frac{-14}{17}, \frac{7}{16}, \frac{7}{13}, \frac{-9}{13}, \frac{2}{6}$

LCM of $17, 16, 13, 6 = 10,608$

$\frac{-14 \times 624}{17 \times 624} = \frac{-8,736}{10,608}, \frac{7 \times 663}{16 \times 663} = \frac{4,641}{10,608}$

$\frac{7 \times 816}{13 \times 816} = \frac{5,712}{10,608}, \frac{-9 \times 816}{13 \times 816} = \frac{-7,344}{10,608}$

$\frac{2 \times 1768}{6 \times 1768} = \frac{3,536}{10,608}$

Arrange in descending order

$\frac{7}{13} > \frac{7}{16} > \frac{2}{6} > \frac{-9}{13} > \frac{-14}{17}$

10. LCM of 8 and $9 = 72$

$\frac{-6 \times 9}{8 \times 9} = \frac{-54}{72}, \frac{-4 \times 8}{9 \times 8} = \frac{-32}{72}$

$\therefore \frac{-50}{72}, \frac{-49}{72}, \frac{-40}{72}, \frac{35}{72}, \frac{-33}{72}$ are

5 rational number between $\frac{-6}{8}$ and $\frac{-4}{9}$

EXERCISE-9.2

1. (a) $\frac{2}{9} + \frac{8}{14}$

LCM of 9 and $14 = 126$

$\frac{28 + 72}{126} = \frac{\overset{50}{\cancel{100}}}{\underset{63}{\cancel{126}}} = \frac{50}{63}$

(b) $\frac{5}{8} + \frac{14}{5}$

LCM of 8 and $5 = 40$

$\frac{25 + 112}{40} = \frac{137}{40} = 3\frac{17}{40}$

(c) $\frac{-3}{55} + \frac{4}{11}$

LCM of 55 and $11 = 55$

$\frac{-3 + 20}{55} = \frac{17}{55}$

(d) $\frac{56}{8} + \left(\frac{-3}{8}\right) = \frac{56 - 3}{8} = \frac{53}{8} = 6\frac{5}{8}$

(e) $\frac{1}{9} + \frac{5}{9} = \frac{1+5}{9} = \frac{\overset{2}{\cancel{6}}}{\underset{3}{\cancel{9}}} = \frac{2}{3}$

(f) $\frac{3}{12} + \left(\frac{-5}{12}\right) = \frac{3-5}{12} = \frac{\overset{1}{\cancel{-2}}}{\underset{6}{\cancel{12}}} = \frac{-1}{6}$

(g) $\frac{-7}{8}+\left(\frac{-5}{8}\right)=\frac{-7-5}{8}=\frac{\overset{3}{\cancel{-12}}}{\underset{2}{\cancel{8}}}=\frac{-3}{2}=-1\frac{1}{2}$

(h) $\frac{2}{4}+\frac{1}{12}=\frac{6+1}{12}=\frac{7}{12}$

(i) $\frac{-6}{20}+\left(\frac{-4}{5}\right)=\frac{-6}{20}-\frac{4}{5}=\frac{-6-16}{20}=\frac{-\overset{11}{\cancel{22}}}{\underset{10}{\cancel{20}}}=\frac{-11}{10}=-1\frac{1}{10}$

(j) $\frac{-3}{4}+\frac{18}{12}=\frac{-9+18}{12}=\frac{\overset{3}{\cancel{9}}}{\underset{4}{\cancel{12}}}=\frac{3}{4}$

(k) $\frac{3}{4}+\frac{3}{9}=\frac{27+12}{36}=\frac{\overset{13}{\cancel{39}}}{\underset{12}{\cancel{36}}}=1\frac{1}{12}$

(l) $\frac{1}{10}+\left(\frac{-1}{8}\right)=\frac{1}{10}-\frac{1}{8}=\frac{4-5}{40}=\frac{-1}{40}$

(m) $\frac{2}{12}+\left(\frac{-3}{4}\right)=\frac{2-9}{12}=\frac{-7}{12}$

(n) $\frac{-3}{4}+\left(\frac{-2}{5}\right)=\frac{-15-8}{20}=\frac{-23}{20}=-1\frac{3}{20}$

(o) $\frac{4}{7}+\frac{5}{3}=\frac{12+35}{21}=\frac{47}{21}=2\frac{5}{21}$

(p) $\frac{-7}{9}+\frac{8}{9}=\frac{-7+8}{9}=\frac{1}{9}$

2. (a) $\frac{8}{10}-\frac{3}{4}=\frac{16-15}{20}=\frac{1}{20}$

(b) $\frac{5}{6}-\left(\frac{-3}{5}\right)=\frac{25+18}{30}=\frac{43}{30}=1\frac{13}{30}$

(c) $\frac{-4}{7}$ from $\frac{-7}{3}$

$\frac{-7}{3}-\left(\frac{-4}{7}\right)=\frac{-49+12}{21}=\frac{-37}{21}=-1\frac{16}{21}$

(d) $\frac{-10}{10}-\left(\frac{6}{7}\right)=\frac{-70-60}{70}=\frac{-13\cancel{0}}{7\cancel{0}}=-1\frac{6}{7}$

(e) $\frac{5}{8}-\left(\frac{-2}{4}\right)=\frac{5+4}{8}=\frac{9}{8}=1\frac{1}{8}$

(f) $\frac{-4}{18}-\frac{2}{5}=\frac{-20-36}{90}=\frac{\overset{28}{\cancel{-56}}}{\underset{45}{\cancel{90}}}=\frac{-28}{45}$

3. (a) $\left(\frac{-\cancel{7}^{1}}{\cancel{7}_{1}}\right) + \frac{\cancel{3}^{1}}{\cancel{9}_{3}} + \frac{1}{6}$

$-1 + \frac{1}{3} + \frac{1}{6}$

$\frac{-6+2+1}{6} = \frac{\cancel{-3}^{1}}{\cancel{6}_{2}} = \frac{-1}{2}$

(b) $\frac{1}{3} + \left(\frac{-3}{4}\right) + \frac{7}{8} = \frac{8+(-18)+21}{24} = \frac{8-18+21}{24} = \frac{-10+21}{24} = \frac{11}{24}$

(c) $\frac{1}{6} + \frac{5}{12} + \left(\frac{-1}{16}\right)$

$\frac{7+20-3}{48} = \frac{\cancel{24}^{\cancel{12}^{\cancel{2}^{1}}}}{\cancel{48}_{\cancel{24}_{\cancel{2}}}} = \frac{1}{2}$

(d) $\frac{\cancel{4}^{2}}{\cancel{10}_{5}} + \left(\frac{-13}{15}\right) + \left(\frac{-9}{25}\right)$

$\frac{2}{5} + \left(\frac{-13}{15}\right) + \left(\frac{-9}{25}\right)$

$\frac{30-65-27}{75} = \frac{30-92}{75} = \frac{-62}{75}$

(e) $3\frac{1}{7} + \left(\frac{-5}{18}\right) + \left(\frac{-7}{72}\right) + 2\frac{3}{4}$

$\frac{22}{7} - \frac{5}{18} - \frac{7}{72} + \frac{11}{4}$

$= \frac{1584-140-49+1386}{504} = \frac{\cancel{2781}^{\cancel{927}^{309}}}{\cancel{504}_{\cancel{168}_{56}}} = 5\frac{29}{56}$

(f) $5\frac{2}{7} - \frac{8}{9} + \left(\frac{-3}{14}\right) = \frac{37}{7} - \frac{8}{9} - \frac{3}{14}$

$= \frac{666-252-27}{126} = \frac{\cancel{387}^{\cancel{129}^{43}}}{\cancel{126}_{\cancel{42}_{14}}} = 3\frac{1}{14}$

4. (a) $\frac{\overset{1}{\cancel{4}}}{3} \times \frac{5}{\underset{3}{\cancel{12}}} = \frac{5}{9}$

(b) $\frac{-8}{11} \times 5 = \frac{-40}{11} = -3\frac{7}{11}$

(c) $\frac{-\overset{1}{\cancel{10}}}{\underset{2}{\cancel{8}}} \times \frac{\overset{1}{\cancel{4}}}{\underset{1}{\cancel{10}}} = \frac{-1}{2}$

(d) $\frac{\overset{1}{\cancel{2}}}{3} \times \frac{1}{\underset{1}{\cancel{2}}} = \frac{1}{3}$

(e) $\frac{\overset{2}{\cancel{10}}}{\underset{3}{\cancel{9}}} \times \frac{\overset{1}{\cancel{-3}}}{\underset{1}{\cancel{5}}} = \frac{-2}{3}$

(f) $\frac{-7}{4} \times \frac{-5}{6} = \frac{35}{24} = 1\frac{11}{24}$

(g) $\frac{\overset{3}{\cancel{21}}}{\underset{7}{\cancel{14}}} \times \frac{\overset{2}{\cancel{-4}}}{\underset{1}{\cancel{7}}} = \frac{-6}{7}$

(h) $\frac{-4}{\cancel{8}} \times \frac{\overset{1}{\cancel{-8}}}{9} = \frac{+4}{9}$

5. (a) $\frac{2}{9} \div \frac{8}{14}$

$\frac{\overset{1}{\cancel{2}}}{9} \times \frac{\overset{7}{\cancel{14}}}{\underset{2}{\cancel{8}}} = \frac{7}{18}$

(b) $\frac{5}{8} \div \frac{14}{5}$

$= \frac{5}{8} \times \frac{5}{14} = \frac{25}{112}$

(c) $\frac{-3}{55} \div \frac{4}{11}$

$= \frac{-3}{\underset{5}{\cancel{55}}} \times \frac{\overset{1}{\cancel{11}}}{4} = \frac{-3}{20}$

(d) $\frac{56}{8} \div \frac{-3}{8}$

$= \frac{\overset{7}{\cancel{56}}}{\cancel{8}} \times \frac{8}{-3} = \frac{-56}{3} = -18\frac{2}{3}$

(e) $\frac{-8}{9} \div \frac{-4}{7}$

$= \frac{\overset{2}{\cancel{-8}}}{9} \times \frac{-7}{\underset{1}{\cancel{4}}} = \frac{14}{9} = 1\frac{5}{9}$

(f) $\frac{22}{37} \div \frac{-31}{30}$

$= \frac{22}{37} \times \frac{30}{-31} = \frac{-660}{1147}$

(g) $\frac{2}{3} \div \frac{7}{15}$

$= \frac{2}{\underset{1}{\cancel{3}}} \times \frac{\overset{5}{\cancel{15}}}{7} = \frac{10}{7} = 1\frac{3}{7}$

(h) $\frac{24}{3} \div \frac{8}{12}$

$= \frac{\overset{3}{\cancel{24}}}{\underset{1}{\cancel{3}}} \times \frac{\overset{4}{\cancel{12}}}{\underset{1}{\cancel{8}}} = 12$

6. The cost of one packet of coffee = ₹ 240

The cost of reduction by first shopkeeper = $240 \times \frac{1}{5} = 48$

240 – 48 = ₹ 192

The cost of reduction of second shopkeeper = $24\cancel{0} \times \frac{1}{1\cancel{0}} = 24$

240 – 24 = ₹ 216

As the decreased amount of first shopkeeper is less than the second shopkeeper. So, the offer of first shopkeeper is better.

The difference between both the offers is 216 –192 = ₹ 24

∴ The price at which the coffee is sold is ₹ 24

7. Total audience = 600

Number of women in theatre = $\frac{600}{2} = 300$

Again $\frac{1}{3}$ of women's population in theatre is school girls,

So, number of school girls in theatre = $\frac{1}{3}$ of number of women audience = $\frac{1}{3} \times 300 = 100$

Hence, the number of school girls in theatre is 100.

8. Compare the fractions by making the denominators of all fractions same.

Book read by Rohan = $\frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$

Book read by Mohan = $\frac{5}{6}$

Book read by Sohan = $\frac{2 \times 2}{3 \times 2} = \frac{4}{6}$

The order of reading the book can be arranged as $\frac{3}{6} < \frac{4}{6} < \frac{5}{6}$

∴ The order from the one who read the book most of the least is Mohan, Sohan, Rohan.

NCERT CORNER

EXERCISE-9.1

1. (a) –1 and 0

$\frac{-1}{1} \times \frac{7}{7} = \frac{-7}{7}$

$\frac{0 \times 7}{1 \times 7} = \frac{0}{7}$

∴ $\frac{-6}{5}, \frac{-5}{7}, \frac{-4}{7}, \frac{-3}{7}, \frac{-2}{7}$ are five rational number between – 1 and 0

(b) – 2 and – 1

$\frac{-2 \times 6}{1 \times 6} = \frac{-12}{6}$ and $\frac{-1 \times 6}{1 \times 6} = \frac{-6}{6}$

∴ $\frac{-11}{6}, \frac{-10}{6}, \frac{-9}{6}, \frac{-8}{6}, \frac{-7}{6}$ are five rational number between – 2 and – 1

(c) $\frac{-4}{5}$ and $\frac{-2}{3}$

$\frac{-4 \times 9}{5 \times 9} = \frac{-36}{45}$ and $\frac{-2 \times 15}{3 \times 15} = \frac{-30}{45}$

∴ $\frac{-35}{45}, \frac{-34}{45}, \frac{-33}{45}, \frac{-32}{45}, \frac{-31}{45}$ are five rational number between $\frac{-4}{5}$ and $\frac{-2}{3}$

(d) $\frac{-1}{2}$ and $\frac{2}{3}$

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

$\therefore \frac{-2}{6}, \frac{-1}{6}, \frac{1}{6}, \frac{2}{6}, \frac{3}{6}$ are five rational number between $\frac{-1}{2}$ and $\frac{2}{3}$

2. (a) $\frac{-3}{5}, \frac{-6}{10}, \frac{-9}{15}, \frac{-12}{20}$

$\frac{-3\times 2}{5\times 2}=\frac{-6}{10}, \frac{-3\times 3}{5\times 3}=\frac{-9}{15}, \frac{-3\times 4}{5\times 4}=\frac{-12}{20},$

$\frac{-3\times 5}{5\times 5}=\frac{-15}{25}, \frac{-3\times 6}{5\times 6}=\frac{-18}{30}, \frac{-3\times 7}{5\times 7}=\frac{-21}{35}, \frac{-3\times 8}{5\times 8}=\frac{-24}{40}$

$\therefore$ four more rational number are $\frac{-15}{25}, \frac{-18}{30}, \frac{-21}{35}, \frac{-24}{40}$

(b) $\frac{-1}{4}, \frac{-2}{8}, \frac{-3}{12}, \frac{-1\times 4}{4\times 4}=\frac{-4}{16}, \frac{-1\times 5}{4\times 5}=\frac{-5}{20}, \frac{-1\times 6}{4\times 6}=\frac{-6}{24},$

$\frac{-1\times 7}{4\times 7}=\frac{-7}{28}, \frac{-1\times 8}{4\times 8}=\frac{-8}{32}$

$\therefore$ four more rational number are $\frac{4}{16}, \frac{-5}{20}, \frac{-6}{24}, \frac{-7}{28}$

(c) $\frac{1}{-6}, \frac{2}{-12}, \frac{3}{-18}, \frac{4}{-24}$

$\therefore$ four more rational number are $\frac{5}{-30}, \frac{6}{-36}, \frac{7}{-42}, \frac{8}{-48}$

(d) $\frac{2}{3}, \frac{2}{-3}, \frac{4}{-6}, \frac{6}{-9}$

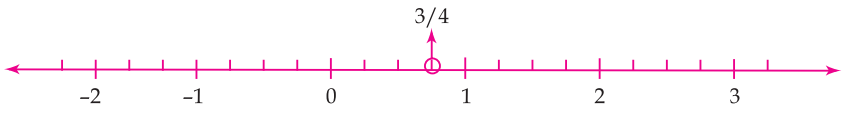
$\therefore$ four more rational number are $\frac{8}{-12}, \frac{10}{-15}, \frac{12}{-18}, \frac{14}{-21}$

3. (a) $\frac{-2}{7}=\frac{-2\times 2}{7\times 2}=\frac{-4}{14}=\frac{-6}{21}=\frac{-8}{28}=\frac{-10}{35}$

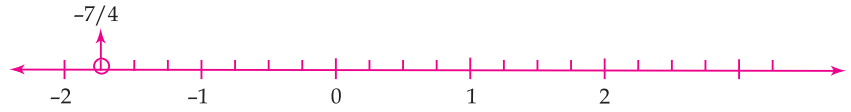
(b) $\frac{5}{-3}=\frac{10}{-6}=\frac{15}{-9}=\frac{20}{-12}=\frac{25}{-15}$

(c) $\frac{4}{9}=\frac{8}{18}=\frac{12}{27}=\frac{16}{36}=\frac{28}{63}$

4. (a)



(b)

(c) 

(d) 

5. P represent = $\frac{7}{3}$, Q represent = $\frac{8}{3}$, R represent = —— , S represent = $\frac{-5}{3}$

6. (a) $\frac{-7}{21}$ and $\frac{3}{9}$

$\frac{-\cancel{7}^{1}}{\cancel{21}_{3}} = \frac{-1}{3}$ and $\frac{\cancel{3}^{1}}{\cancel{9}_{3}} = \frac{1}{3}$

$\therefore$ This is not same

(b) $\frac{-16}{20}$ and $\frac{20}{-25}$

$\frac{-\cancel{16}^{4}}{\cancel{20}_{5}} = \frac{-4}{5}$ and $\frac{20}{-25} = \frac{4}{-5} = \frac{-4}{5}$

$\therefore$ This is same

(c) $\frac{-2}{-3}$ and $\frac{2}{3}$

$\frac{-2}{-3} = \frac{2}{3}$ and $\frac{2}{3}$

$\therefore$ This is same

(d) $\frac{-3}{5}$ and $\frac{-12}{20}$

$\frac{-3}{5}$ and $\frac{-\cancel{12}^{3}}{\cancel{20}_{5}} = \frac{-3}{5}$

$\therefore$ This is same

(e) $\frac{8}{-5}$ and $\frac{-24}{15}$

$\frac{8}{-5} = \frac{-8}{5}$ and $\frac{-\cancel{24}^{8}}{\cancel{15}_{5}} = \frac{-8}{5}$

$\therefore$ This is same

(f) $\frac{1}{3}$ and $\frac{-1}{9}$

$\therefore$ This is not same

(g) $\frac{-5}{-9}$ and $\frac{5}{-9}$

$\frac{5}{9}$ and $\frac{-5}{9}$

$\therefore$ This is not same

7. (a) $\frac{-\cancel{8}^{4}}{\cancel{6}_{3}} = \frac{-4}{3}$

(b) $\frac{\cancel{25}^{5}}{\cancel{45}_{9}} = \frac{5}{9}$

(c) $\frac{-\cancel{44}^{11}}{\cancel{72}_{18}} = \frac{-11}{18}$

(d) $\frac{-\cancel{8}^{4}}{\cancel{10}_{5}} = \frac{-4}{5}$

8. (a) $\frac{-5}{7} \square \frac{2}{3}$

$\frac{-5 \times 3}{7 \times 3} \square \frac{2 \times 7}{3 \times 7}$

$\frac{-15}{21} \boxed{<} \frac{14}{21}$

$\therefore \frac{-5}{7} \boxed{<} \frac{2}{3}$

(b) $\frac{-4}{5} \square \frac{-5}{7}$

$\frac{-4 \times 7}{5 \times 7} = \frac{-28}{35} \boxed{<} \frac{-5 \times 5}{7 \times 5} = \frac{-25}{35}$

$\therefore \frac{-4}{5} \boxed{<} \frac{-5}{7}$

(c) $\frac{-7}{8} \square \frac{14}{-16}$

$\frac{-7}{8} \square \frac{\overset{7}{\cancel{14}}}{\underset{-8}{\cancel{-16}}} \Rightarrow \frac{-7}{8} \boxed{=} \frac{-7}{8}$

$\therefore \frac{-7}{8} \boxed{=} \frac{14}{-16}$

(d) $\frac{-8}{5} \square \frac{-7}{4}$

$\frac{-8 \times 4}{5 \times 4} = \frac{-32}{20} \boxed{>} \frac{-7 \times 5}{4 \times 5} = \frac{-35}{20}$

$\therefore \frac{-8}{5} \boxed{>} \frac{-7}{4}$

(e) $\frac{1}{-3} \square \frac{-1}{4}$

$\frac{+1 \times 4}{-3 \times -4} = \frac{-4}{12} \boxed{<} \frac{-1 \times 3}{4 \times 3} = \frac{-3}{12}$

$\therefore \frac{1}{-3} \boxed{<} \frac{-1}{4}$

(f) $\frac{5}{-11} \boxed{=} \frac{-5}{11}$

(g) $0 \boxed{>} \frac{-7}{6}$

9. (a) $\frac{2}{3}, \frac{5}{2}$

$\frac{2 \times 2}{3 \times 2} = \frac{4}{6}, \frac{5 \times 3}{2 \times 3} = \frac{15}{6}$

$\frac{4}{6} < \frac{15}{6}$

$\therefore \frac{5}{2}$ is greater

(b) $\frac{-5}{6}, \frac{-4}{3}$

$\frac{-5 \times 1}{6 \times 1} = \frac{-5}{6}, \frac{-4 \times 2}{3 \times 2} = \frac{-8}{6}$

$\frac{-5}{6} > \frac{-8}{6}$

$\therefore \frac{-5}{6}$ is greater

(c) $\frac{-3}{4}, \frac{2}{-3}$

$\frac{-3 \times +3}{4 \times +3} = \frac{-9}{+12}, \frac{2 \times -4}{-3 \times -4} = \frac{-8}{+12}$

$\frac{-9}{12} < \frac{-8}{12}$

$\therefore \frac{2}{-3}$ is greater

(d) $\frac{-1}{4}, \frac{1}{4}$

$\frac{1}{4} > \frac{-1}{4}$

$\therefore \frac{1}{4}$ is greater

(e) $-3\frac{2}{7}, -3\frac{4}{5}$

$\frac{-23}{7}, \frac{-19}{5}$

$\frac{-23\times5}{7\times5}=\frac{-115}{35}, \frac{-19\times7}{5\times7}=\frac{-133}{35}$

$\frac{-115}{35} > \frac{-133}{35}$

$\therefore -3\frac{2}{7}$ is greater

10. (a) $\frac{-3}{5}, \frac{-2}{5}, \frac{-1}{5}$

$\therefore \frac{-3}{5} < \frac{-2}{5} < \frac{-1}{5}$

(b) $\frac{-1}{3}, \frac{-2}{9}, \frac{-4}{3}$

$\frac{-1\times3}{3\times3}=\frac{-3}{9}, \frac{-2}{9}, \frac{-4\times3}{3\times3}=\frac{-12}{9}$

$\therefore \frac{-12}{9} < \frac{-3}{9} < \frac{-2}{9}$

$\therefore \frac{-4}{3} < \frac{-1}{3} < \frac{-2}{9}$

(c) $\frac{-3}{7}, \frac{-3}{2}, \frac{-3}{4}$

$\frac{-3\times4}{7\times4}=\frac{-12}{28}, \frac{-3\times14}{2\times14}=\frac{-42}{28}, \frac{-3\times7}{4\times7}=\frac{-21}{28}$

$\therefore \frac{-42}{28} < \frac{-21}{28} < \frac{-12}{28}$

$\therefore \frac{-3}{2} < \frac{-3}{4} < \frac{-3}{7}$

EXERCISE-9.2

1. (a) $\frac{5}{4}+\frac{-11}{4}=\frac{5-11}{4}=\frac{\overset{3}{\cancel{-6}}}{\underset{2}{\cancel{4}}}=\frac{-3}{2}$

(b) $\frac{5}{3}+\frac{3}{5}=\frac{25+9}{15}=\frac{34}{15}$

(c) $\frac{-9}{10}+\frac{22}{15}=\frac{-27+44}{30}=\frac{17}{30}$

(d) $\frac{\cancel{+3}}{\cancel{+11}}+\frac{5}{9}=\frac{27+55}{99}=\frac{82}{99}$

(e) $\frac{-8}{19}+\left(\frac{-2}{57}\right)=\frac{-8}{19}-\frac{2}{57}=\frac{-24-2}{57}=\frac{-26}{57}$

(f) $\frac{-2}{3}+0=\frac{-2}{3}$

(g) $\frac{-7}{3}+\frac{23}{5}=\frac{-35+69}{15}=\frac{34}{15}$

2. (a) $\frac{7}{24}-\frac{17}{36}=\frac{21-34}{72}=\frac{-13}{72}$

(b) $\frac{5}{63}-\left(\frac{-6}{21}\right)=\frac{5}{63}+\frac{6}{21}=\frac{5+18}{63}=\frac{23}{63}$

(c) $\frac{-6}{13}-\left(\frac{-7}{15}\right)=\frac{-6}{13}+\frac{7}{15}=\frac{-90+91}{195}=\frac{1}{195}$

(d) $\frac{-3}{8} - \frac{7}{11} = \frac{-33-56}{88} = \frac{-89}{88}$

(e) $-2\frac{1}{9} - 6 = \frac{-19}{9} - \frac{6}{1} = \frac{-19-54}{9} = \frac{-73}{9}$

3. (a) $\frac{9}{2} \times \frac{-7}{4} = \frac{-63}{8}$

(b) $\frac{3}{10} \times -9 = \frac{-27}{10}$

(c) $\frac{-6}{5} \times \frac{9}{11} = \frac{-54}{55}$

(d) $\frac{3}{7} \times \frac{-2}{5} = \frac{-6}{35}$

(e) $\frac{3}{11} \times \frac{2}{5} = \frac{6}{55}$

(f) $\frac{\cancel{3}^{1}}{\cancel{5}_{1}} \times \frac{\cancel{5}^{1}}{\cancel{3}_{1}} = 1$

4. (a) $-4 \div \frac{2}{3} = -\frac{\cancel{4}^{2}}{} \times \frac{3}{\cancel{2}_{1}} = -6$

(b) $\frac{-3}{5} \div 2 = \frac{-3}{5} \times \frac{1}{2} = \frac{-3}{10}$

(c) $\frac{-4}{5} \div (-3) = \frac{\cancel{-4}}{5} \times \frac{1}{\cancel{-3}} = \frac{4}{15}$

(d) $\frac{-1}{8} \div \frac{3}{4} = \frac{-1}{\cancel{8}_{2}} \times \frac{\cancel{4}}{3} = \frac{-1}{6}$

(e) $\frac{-2}{13} \div \frac{1}{7} = \frac{-2}{13} \times \frac{7}{1} = \frac{-14}{13}$

(f) $\frac{-7}{12} \div \frac{-2}{13} = \frac{-7}{12} \times \frac{13}{-2} = \frac{\cancel{-91}}{\cancel{24}} = \frac{91}{24}$

(g) $\frac{3}{13} \div \frac{-4}{65} = \frac{3}{\cancel{13}_{1}} \times \frac{\cancel{65}^{5}}{-4} = \frac{15}{-4}$

SUBJECT ENRICHMENT EXERCISE

I. (1) 0

(2) $\frac{-1}{6}$

(3) $\frac{-4}{5}$

(4) -1

(5) 1

II. (1) $\frac{-7}{15} = \frac{\boxed{-21}}{45} = \frac{28}{\boxed{-60}}$

(2) $\frac{5}{8}$

(3) $\frac{-24}{40}, \frac{-48}{80}$

(4) $\frac{3}{10}$

(5) $\frac{-35}{6}$

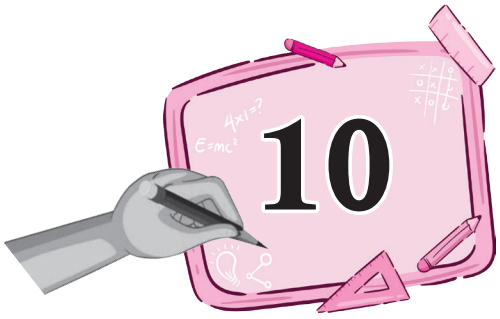
III. (1) True

(2) False

(3) False

(4) True

(5) False



Practical Geometry

EXERCISE-10.1

1. (a) **Step of Construction:**

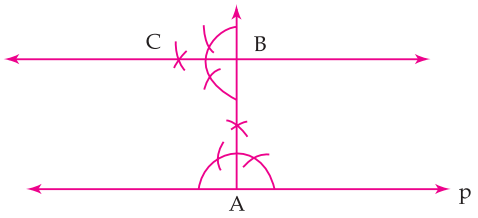
(i) Draw a line P and take a point A on it.

(ii) At point A construct on angle 90° and cut this perpendicular line at a distance 3 cm from A such that AB = 3 cm.

(iii) To Draw a line parallel to line P and Passing through B, construct ∠ABC = 90°

Extend this line on both sides.

Line BC is the required line parallel to line P at a distance of 3 cm from it.



(b) **Step Of construction:**

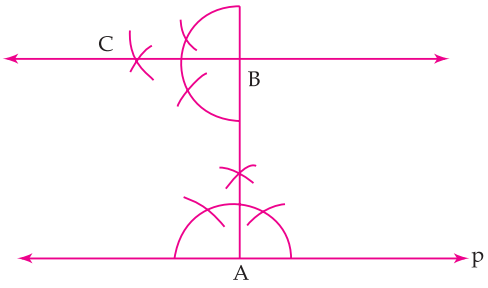
(i) Draw a line P and take a point A on it.

(ii) At point A construct on angle 90° and cut this perpendicular line at a distance 4.5 cm from A such that AB = 4.5 cm.

(iii) To Draw a line parallel to line P and Passing through B, construct ∠ABC = 90°

Extend this line on both sides.

Line BC is the required line parallel to line P at a distance of 4.5 cm from it.



2. Step of construction:

(i) Draw a line DE = 5 cm and mark a point M below the line.

(ii) Mark a point F on the line DE and Join FM.

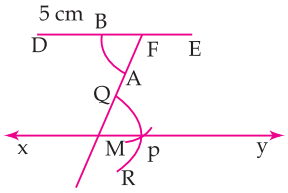
(iii) Taking F as centre and convenient radius, draw an arc cutting DE at B and MF at A.

(iv) Now, taking M as centre and the same radius as in step 3 draw an arc cutting QRat Q.

(v) Taking Q as centre and radius equal to AB draw an arc cutting the arc QR at P

(vi) Join MP and Extend it in both the direction to get the parallel line.

Distance between DE and XY = 3.2 cm



3. Steps of Construction:

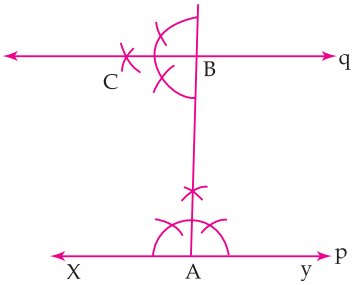
(i) Draw a line P and take a point A on it.

(ii) At point A construct on angle 90° and cut this perpendicular line at a distance 6.5 cm from A such that AB = 6.5 cm.

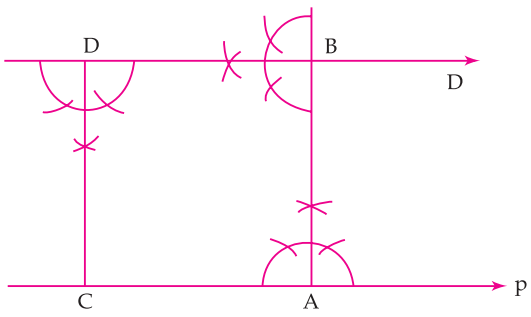
(iii) To Draw a line parallel to line P and Passing through B, construct ∠ABC = 90°

Extend this line on both sides.

Line BC is the required line parallel to line P at a distance of 6.5 cm from it.



4. Step of Construction:



(i) Draw a line P and take a point A on it.

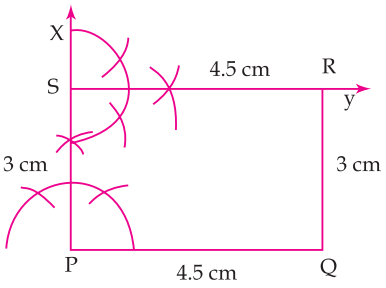
(ii) At point A construct on angle 90° and cut this perpendicular line at a distance 5.5 cm from A such that AB = 5.5 cm.

(iii) To Draw a line parallel to line P and Passing through B, construct ∠ABC = 90°

Extend this line on both sides.

Line BD is the required line parallel to line P at a distance of 5.5 cm from it and again draw a line CD || AB from point D.

5. Step of Construction:



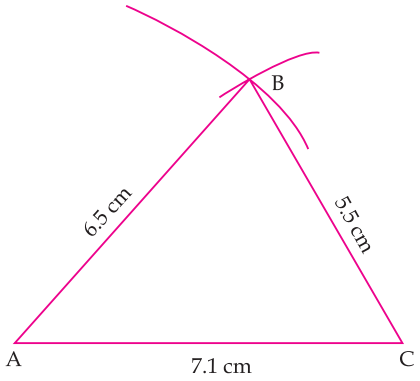
1. Draw a line segment PQ = 4.5 cm
2. Taking P as centre and draw a perpendicular PX and Cut PX at a distance 3 cm from P such that PS = 3 cm
3. Now, Taking S as centre and draw an angle 90° and cut this perpendicular line at a distance 4.5cm from S such that SR = 4.5 cm.
4. To draw a line parallel to PQ and passing through R, Construct ∠RSP = 90°
5. Join RQ

   RQ = 3 cm

   ∴ PQRS is the rectangle

EXERCISE 10.2

1. Step of Construction:

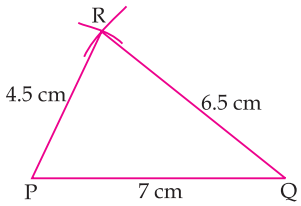


1. Draw a line segment AC = 7.1 cm
2. With A as the centre and radius 6.5 cm (= AB), draw an arc on one side AC.
3. With C as the centre and radius 5.5 cm (= BC), draw another arc intersecting the first arc at B

Join AB and BC

Then, ΔABC is the required Δ.

2. Step of Construction:



1. Draw a line segment PQ = 7 cm
2. With P as the centre and radius 4.5 cm (= PR), draw an arc on one side PQ.
3. With Q as the centre and radius 6.5 cm (= RQ), draw another arc intersecting the first arc at R.

   Joint PR and RQ

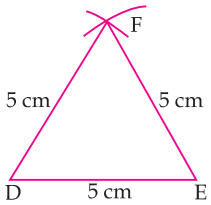
   Then, ΔPQR is the required Δ

   m∠P = 65°, m∠Q = 40°, m∠R = 75°

3. Step of Construction:

1. Draw a line segment DE = 5 cm
2. With A as the centre and radius 5 cm (= DF), draw an arc on one side DE.
3. With E as the centre and radius 5 cm (= EF), draw another arc intersecting the first arc at F.

   Join DF and EF

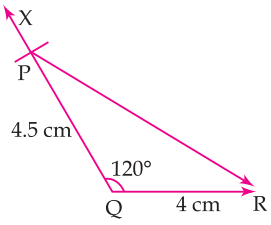


The, ΔDEF is the required Δ.

All angles of Δ are 60°

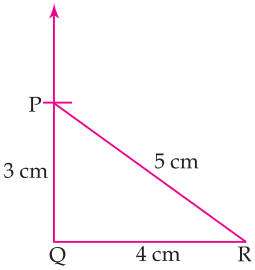
4. Step of Construction:

1. Draw a line segment QR = 4cm
2. At Q, draw QX making 120° with QR
3. With Q as centre, draw an arc of radius 4.5cm
   It cuts QX at point P.
4. Join PR Δ PQR is now obtained



5. Step of Construction:

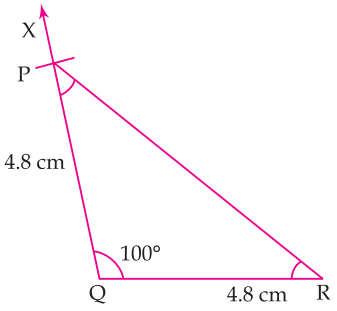
1. Draw a line segment QR = 4cm
2. At Q, draw QX making 90° with QR
3. With Q as centre, draw an arc of radius 4.3 cm
   It cuts QX at point P.
4. Join PR Δ PQR is now obtained



$$PR^2 = PQ^2 + QR^2$$
$$= (3)^2 = (4)^2$$
$$PR = \sqrt{9+16} = \sqrt{25} = 5\text{cm}$$

6. Step of Construction:

1. Draw a line segment QR = 4.8 cm
2. At Q, draw QX making 100° with QR
3. With Q as centre, draw an arc of radius 4.8 cm
   It cuts QX at point P.
4. Join PR Δ PQR is now obtained



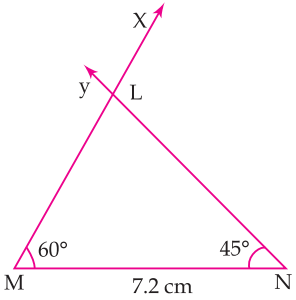
The other two angles are 40° each because the two angles opposite to the equal sides are equal to each other.

EXERCISE 10.3

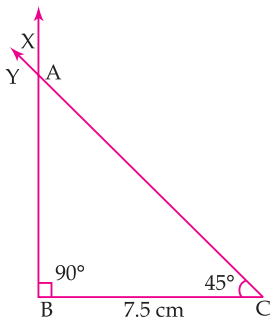
1. Step of Construction:

1. Draw MN = 7.2 cm
2. At M draw a ray MX making an angle of 60° with MN.
3. At N, draw a ray NY making an angle of 45° with MN.
4. Produce MX and NY, when the both rays are intersect each other at L.

   ΔLMN is now completed.



2. Step of construction:



1. Draw BC = 7.5 cm
2. At B draw a ray BX making an angle of 90° with BC.
3. At C, draw a ray CY making an angle of 45° with BC.
4. Produce BX and CY, when the both rays are intersect each other at A.

   ΔABC is now completed.

In ΔABC,

∠B = 90°, ∠C = 45° and ∠A is also 45°

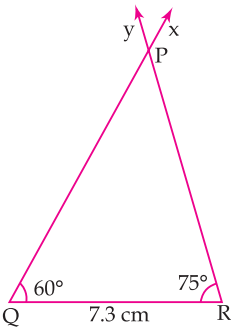
Then AB = BC = 7.5 cm

3. In ΔPQR

∠P = 45°, ∠Q = 60°, ∠R = 180° – ∠P – ∠Q (Sum of angles of Δ is 180°)

= 180° – 45° – 60°

= 75°



Now, Constract a ΔPQR

Step of construction:

1. Draw QR = 7.3 cm
2. At Q draw a ray QX making an angle of 60° with QR.
3. At P, draw a ray RY making an angle of 75° with QR.
4. Produce QX and RY, when the both rays are intersect each other at P.

   ΔPQR is now completed.

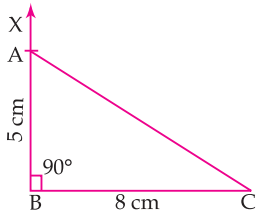
4. Sum of three angles of Δ is 180°

But ∠A + ∠B = 110° + 85° = 195°

This ∠A + ∠B > ∠A + ∠B + ∠C

∴ Triangle ABC can not be constructed.

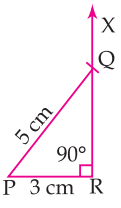
5. Step of construction:



1. Draw a line segment BC = 8 cm
2. At B, draw BX making 90° with BC
3. With B as centre, draw an arc of radius 5 cm

   It cuts BX at point A.
4. Join AC Δ ABC is now obtained.

6. Step of construction:



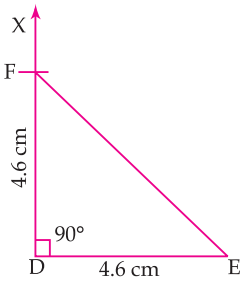
1. Draw PR = 3 cm
2. At R, draw Rx ⊥ PR.
3. With P as centre draw an arc of radius 5 cm.
4. Q has to be on the perpendicular line RQ as well as on the arc draw with centre P.

   ∴Q is the meeting point of these two Δ PQR is now obtained.

   Name the right angle is R.

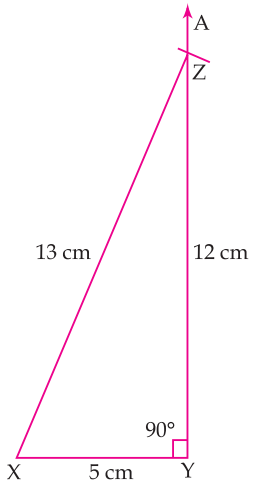
7. Step of Construction:

1. Draw DE = 4.6 cm
2. At D draw a ray DX making an angle of 90° with DE.
3. With D as centre, draw an arc of radius 4.6 cm it cuts DX at point F.
4. Join DF. ΔDEF is now obtained.



8.

$$(XZ)^2 = (XY)^2 + (YZ)^2$$
$$(13)^2 = (5)^2 + (YZ)^2$$
$$(YZ)^2 = 169 - 25$$
$$YZ = \sqrt{144} = 12\text{cm}$$



Step of construction:

1. Draw XY= 5 cm
2. At Y, draw YZ ⊥ XY.
3. With X as centre draw an arc of radius 13 cm.
4. Z has to be on the perpendicular line YZ as well as on the arc draw with centre X.

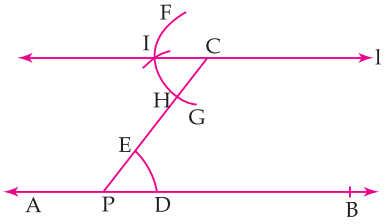
   ∴Z is the meeting point of these two Δ XYZ is now obtained.

   Name the right angle is Y.

NCERT CORNER
EXERCISE 10.1

1. Steps of Construction:

1. Draw a line AB. Take a point P on it. Take a Point C outside this line. Join C to P.
2. Taking P as centre and with a convenient radius draw an arc intersecting line AB at point D and PC at point E
3. Taking C as centre and with the same radius as before, draw an arc FG intersecting PC at H



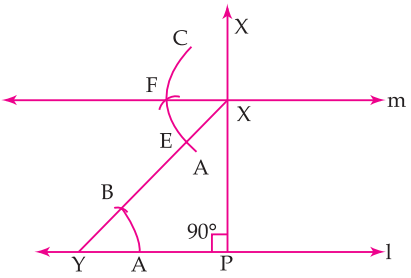
4. Adjust the compasses up to the length of DE without changing the opening of compass and taking H as the centre draw an arc to intersect the previously drawn an arc FG at point I.
5. Join the points C and I to draw a line 'l'.

   This is the required line which is parallel to line AB.

2. Step of constructions:

1. Draw a line l and take a point P on line l.

   Then, draw a perpendicular at point P.
2. Adjusting the compass up to the length of 4cm, draw an arc to intersect this perpendicular at point X. Chose any point Y on line l. Join X to Y.

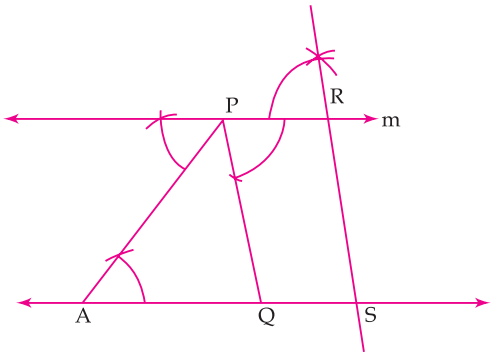


3. Taking Y as centre and with a convenient radius, draw an arc intersecting l at A and XY at B
4. Taking X as centre and with the same radius as before draw an arc CD cutting XY at E.
5. Adjust the compass up to the length of AB. Without changing the opening of compass and taking E as the centre, draw an arc to intersect the previously drawn arc CD at point F.
6. Join the points XF to draw a line 'm' This is the required line which is parallel to line 'l'.

3. In quadrilateral PQSR, opposite lines are parallel to each other.

PQ || RS and PR || QS

Thus, the quadrilateral PQSR is a parallelogram.



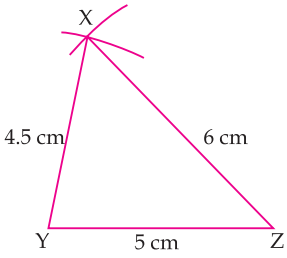
EXERCISE 10.2

1. Step of construction:

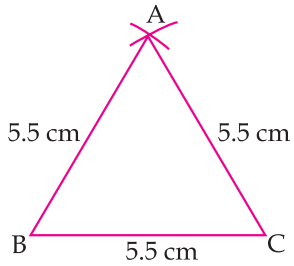
1. Draw a line segment YZ = 5 cm
2. Point X is at a distance of 4.5 cm from point Y.

   ∴ taking point Y as centre, draw an arc of 4.5 cm radius.
3. Point X is at a distance of 6 cm from point Z. Therefore taking point Z as centre draw an arc of 6 cm radius mark the point of intersection of the arc as X. Join XY and XZ.

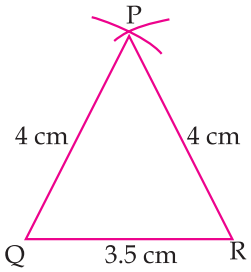
   ∴ XYZ is the required triangle.



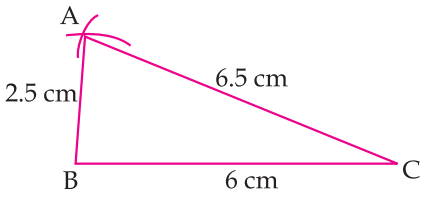
2. We know that all sides of an equilateral triangle are of equal length. Therefore, a triangle ABC has to be constructed with AB = BC = CA = 5.5 cm



3. ΔPQR is the required triangle. As the two sides of this triangle are of the same length (PQ = PR). Therefore, ΔPQR is an isosceles triangle.



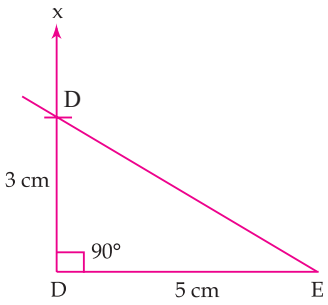
4. ΔABC is the required triangle. It is 90°.



EXERCISE 10.3

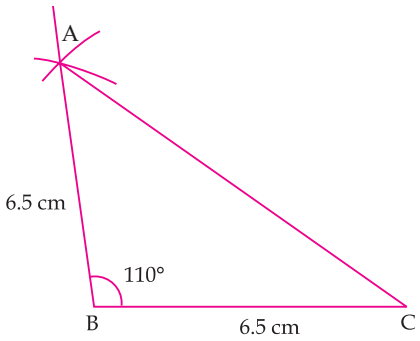
1. Step of construction:

1. Draw a $\overline{DE} = 5$ cm.
2. Taking D as centre, Draw $\angle XDE = 90°$ with DE.
3. With D as centre, draw an arc of radius 3 cm. It cuts DX at F.
4. Join EF, ΔDEF is now obtained.



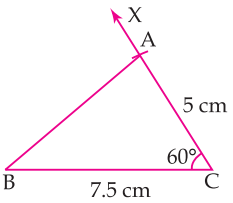
2. Step of construction:

1. Draw a $\overline{BC} = 6.5$ cm.
2. At point B, Draw a ray BX making an angle 110° with BC.
3. Taking B as centre draw an arc of radius 6.5 cm. It cuts BX at A.
4. Join CA, ΔABC is now obtained.



3. Step of construction:

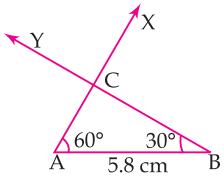
1. Draw a $\overline{BC} = 6.5$ cm.
2. At point C, Draw a ray CX making an angle 60° with BC.
3. Taking C as centre draw an arc of radius 5 cm. It cuts CX at A.
4. Join BA, ΔABC is now obtained.



EXERCISE 10.4

1. Step of construction:

1. Draw a line segment AB = 5.8 cm.
2. At point A, draw a ray AX making 60° angle with AB.
3. At point B, draw a ray BY, Making 30° angle with AB.
4. Produce BY and AX, where the both rays arc intersect each other at C. ΔABC is now completed.

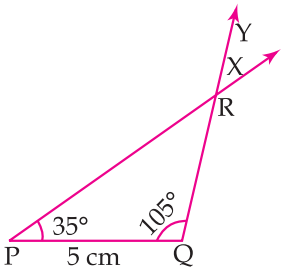


2. In order to construct ΔPQR, the measure of $\angle RPQ$ has to be calculated.
According to the angle sum property of triangle

$$\angle PQR + \angle PRQ + \angle RPQ = 180°$$
$$105° + 40° + \angle RPQ = 180°$$
$$\angle RPQ = 180° - 145°$$
$$\angle RPQ = 35°$$

Step of construction:

1. Draw a line segment PQ = 5 cm
2. At P, draw a ray PX making an angle of 35' with PQ.
3. At Q, draw a ray QY, making an angle of 105° with PQ.
4. Point R has to lie on both the rays, PX and QY.
   Therefore R is the point of intersection of these two rays.
   This is the required ΔPQR



3. Given that ∠E = 110° and ∠F = 80°. Therefore ∠E + ∠F = 110° + 80° = 190°

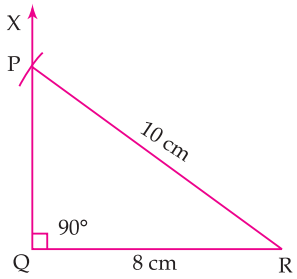
However, according to the angle sum property of triangle we should obtain ∠E + ∠F + ∠D = 180°

∴ the angle sum property is not followed by the given triangle. And thus we cann't construct ΔDEF with the given measurements.

EXERCISE 10.5

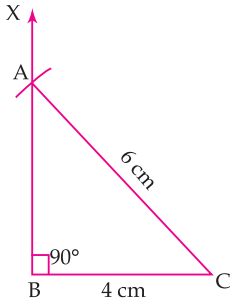
1. Step of construction:

1. Draw a line segment QR = 8 cm
2. At Q, draw a ray QX making 90° with QR
3. Taking R as centre, draw an arc of 10 cm radius to intersect ray QX at point P.
4. Join PR. ΔPQR is the required right-angled triangle.



2. Step of construction:

1. Draw a line segment BC = 4 cm.
2. At B, draw a ray BX making 90° with BC.
3. Taking C as centre, draw an arc of 6 cm radius to intersect ray BX at point A.
4. Join CA. ΔABC is the required right-angled triangle.

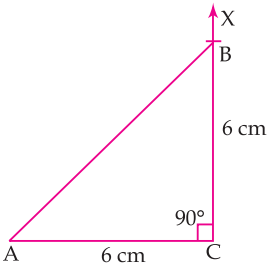


3. In an isosceles Δ, the length of any two sides are equal.

In ΔABC, AC = BC = 6 cm

Step of construction:

1. Draw a line segment AC = 6 cm
2. At C, draw a ray CX making 90° with AC
3. Taking C as centre, draw an arc of 6 cm radius to intersect ray CX at point B.
4. Join AB. ΔABC is the required right-angled triangle.

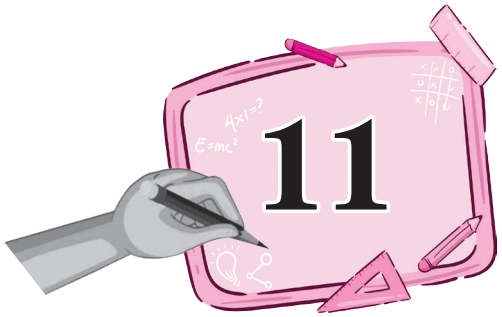


SUBJECT ENRICHMENT EXERCISE

I. 1. 1
2. Infinite
3. 2 cm, 3 cm, 6 cm
4. The measure of these angles are given
5. 37°

II. 1. Three
2. One angle
3. One side
4. Side of a right angle Δ
5. No
6. Exterior
7. ASA
8. True
9. False
10. Equilateral

III. 1. False
2. False
3. True
4. True
5. True



Perimeter and Area

EXERCISE 11.1

1. (a) Perimeter of rectangle $= 2 (l + B)$
$= 2 (12 + 7)$ cm
$= 2 (19)$ cm $= 38$ cm
Area of rectangle $= l \times B$
$= 12 \times 7 = 84$ cm^2

(b) Perimeter of rectangle $= 2 (l + B)$
$= 2 (15 + 9)$ cm
$= 2 (24)$ cm $= 48$ cm
Area of rectangle $= l \times B$
$= 15 \times 9 = 135$ cm^2

(c) Perimeter of rectangle $= 2 (l + B)$
$= 2(8 + 17)$ cm
$= 2 (25)$ cm $= 50$ cm
Area of rectangle $= L \times B$
$= 8 \times 17 = 136$ cm^2

(d) Perimeter of rectangle $= 2 (L + B)$
$= 2 (16.5 + 24.5)$ cm
$= 2 (41.0) = 82$ cm
Area of rectangle $= L \times B$
$= (16.5 \times 24.5)$ cm^2
$= 404.25$ cm^2

2. (a) Perimeter of square $= 4 \times$ side
$= 4 \times 8 = 32$ cm
Area of square $= (\text{side})^2$
$= (8)^2 = 64$ cm^2

(b) Perimeter of square $= 4 \times$ side
$= 4 \times 12 = 48$ cm
Area of square $= (\text{side})^2$
$= (12)^2 = 144$ cm^2

(c) Perimeter of square = 4 × side

= 4 × 7.6 cm = 30.4 cm

Area of square = $(\text{side})^2$

= $(7.6)^2 = 57.76\ \text{cm}^2$

(d) Area of square = $(\text{side})^2$

= $(15.6)^2$ cm = $243.36\ \text{cm}^2$

Perimeter of square = 4 × side

= 4 × (15.6) = 62.4 cm

3. Perimeter of rectangle = Perimeter of square

Perimeter of rectangle = 4(14) cm

Perimeter of rectangle = 56 cm

2 (l + B) = 56

2 (17 + B) = 56

$$17 + B = \frac{56}{2}$$

17 + B = 28

B = 28 – 17 = 11 cm

4. Perimeter of square = 38 cm

4 (side) = 38

$$\text{side} = \frac{38}{4} = 9.5\ \text{cm}$$

Area of square = (side)2

= $(9.5)^2\ \text{cm}^2 = 90.25\ \text{cm}^2$

5. Length of rectangular lawn = 22 m.

Breadth of rectangular lawn = 17 m.

Perimeter = 2 (l + B)

= 2 (22 + 17) – 2 (29) m = 5.8 m

If 3 shrubs can be planted in a meter of hedge

Then, no. of shrubs planted in whole perimeter will be = 3 × 58 = 174 m

6. Perimeter of square plot = 136 m

4 (side) = 136

$$\text{side} = \frac{\overset{34}{\cancel{136}}}{\underset{1}{\cancel{4}}} = 34\text{m}$$

side = 34

Area of square plot = 34 × 34 $\text{m}^2 = 1156\ \text{m}^2$

7. let Breadth of rectangular field = x m

Length of rectangular field = 4x m

Perimeter = 2 (l + B)

48 = 2 (x + 4x)

24 = 5x

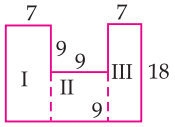
$x = \frac{24}{5} = 4.8\text{m}$

Breadth = 4.8 m

length = 4 × 4.8 = 19.2 m

8. (a) Perimeter of fig. = [7 + 9 + 9 + 9 + 7 + 18 + (7 + 7) + 9 + 18] cm

= 100 cm



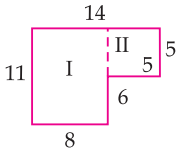
Area of fig. = I + II + III

= (7 × 18) + (9 × 9) + (7 × 18)

= 126 + 81 + 126 = 333 cm^2

(b) Perimeter of fig. = (11 + 8 + 6 + 5 + 5 + 14) cm

= 49 cm



Area of fig. = Area of I fig + Area of II fig.

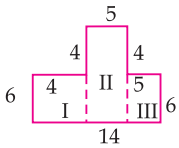
= (11 × 8) + (5 × 5)

= 88 + 25

= 113 cm^2

(c) Perimeter of fig. = (6 + 4 + 4 + 5 + 4 + 5 + 6 + 14) cm

= 48 cm



Area of fig. = I + II + III

= (6 × 4) + (10 × 5) + (6 × 5) cm^2

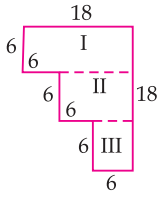
= (24 + 50 + 30) cm^2

= (24 + 80) cm^2

= 104 cm^2

(d) Perimeter of fig. = [6 + 6 + 6 + 6 + 6 + 6 + 18 + 18] cm

= (36 + 36) cm



= 72 cm

Area of fig. = I + II + III

= (6 × 18) + (6 × 12) + (6 × 6) cm^2

= 108 + 72 + 36

= 216 cm^2

9. (a) Perimeter of fig. = 7 cm + 8 cm + 8 cm

= 23 cm

(b) Perimeter of fig. = 6 cm + 3 cm + 4 cm + 4 cm + 2 cm + 7 cm

= 26 cm

(c) Perimeter of fig. = 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm + 2 cm

= 24 cm

10. Area of plot = 350 m^2

l × B = 350

14 × l = 350

$l = \frac{\cancel{350}^{50}}{\cancel{14}_{2}}\text{ m} = 25\text{m}$

Perimeter of plot = 2 (l + B)

= 2 (25 + 14) m

= 2(39) m = 78 m

11. Area of rectangle = Area of square

= 4 × side = 4 (22) m^2 = 88 m^2

l × B

44 × B = 88

$$B = \frac{\overset{2}{\cancel{88}}}{\underset{1}{\cancel{44}}} = 2m$$

∴ Breadth of rectangle = 2m.

12. Area of Parallelogram = 85.5 cm^2

base × height = 85.5 cm^2

base × 7.5 = 85.5 cm^2

$$\text{base} = \frac{\overset{57}{\cancel{85.5}}}{\underset{5}{\cancel{7.5}}} \times \frac{\cancel{10}}{\cancel{10}} = \frac{57}{5} = 11.4cm$$

EXERCISE 11.2

1. (a) Area of parallelogram = b × h

= 25 ×5 cm^2 = 125 cm^2

(b) Area of paralleogram = 32 × 12 = 384 cm^2

(c) Area of paralleogram = 18 × 7 = 126 cm^2

(d) Area of paralleogram = 20 × 18 = 360 cm^2

2. (a) Area of triangle $= \frac{1}{2} \times b \times h = \frac{1}{\cancel{2}} \times 3 \times \overset{2.8}{\cancel{5.6}}$ cm^2 = 8.4 cm^2

(b) Area of triangle $= \frac{1}{2} \times b \times h = \frac{1}{\cancel{2}} \times \overset{2}{\cancel{4}} \times 3.5cm^2$ = 7 cm^2

(c) Area of triangle $= \frac{1}{2} \times b \times h = \frac{1}{\cancel{2}} \times 7 \times \overset{0.9}{\cancel{1.8}}$ cm^2 = 6.3 cm^2

(d) Area of triangle $= \frac{1}{2} \times b \times h = \frac{1}{\cancel{2}} \times \overset{6}{\cancel{12}} \times 5\ cm^2$ = 30 cm^2

3. Area of parallegram = 85.5 cm^2

b × h = 85.5 cm^2

b × 7.5 cm = 85.5 cm^2

$$b = \frac{58.5}{7.5} cm$$

b = 11.4 cm

4. Area of right angled triangle = 72 m^2

If two sides comprising the right angles are equal.

$\therefore$ Base and height of triangle are equal.

Let two equal sides are x

$$\text{Area of triangle} = \frac{1}{2} \times b \times h$$

$$72 = \frac{1}{2} \times x \times x$$

$$72 = \frac{x^2}{2}$$

$$x^2 = 72 \times 2$$

$$x^2 = 144$$

$$x = \sqrt{144} = 12 \text{ cm}$$

$\therefore$ The lenght of two equal sides are 12 cm.

5. Side of a rhombus = 8.5 cm

Altitude = 6cm

Area of rohmbus = base × Altitude

= (8.5 × 6) cm^2

= 51.0 cm^2 = 51 cm^2

6. The perimeter of the parallelogram 1400m

Area = 2100 m^2

Distance between a pair of opposite side is 7m.

Let a, b be the two adjacent sides of the parallelogram

Area of parallelogram = side x its corresponding height

So if a is the side, h will be its corresponding height.

$$h = 7\text{m}$$

$$a \times h = 2100$$

$$a = \frac{\overset{300}{\cancel{2100}}}{\cancel{7}} = 300\text{m}$$

$$\text{Perimeter of a parallelogram} = 2(a + b)$$

$$1400 = 2(300 + b)$$

$$\frac{\overset{700}{\cancel{1400}}}{\underset{1}{\cancel{2}}} = 300 + b$$

$$700 = 300 + b$$

$$b = 700 - 300$$

$$b = 400\text{m}$$

EXERCISE 11.3

1. (a) $d = 28$ cm

Circumference $= \pi d$

$$= \frac{22}{\cancel{7}_{1}} \times \cancel{28}^{4} \text{ cm} = 88 \text{ cm}$$

(b) $d = 18$ cm

Circumfrence $= \pi d$

$$= \frac{22}{7} \times 18 = \frac{396}{7} = 56.57 \text{ cm}$$

(c) $d = 4.2$ cm

Circumference $= \pi d$

$$= \frac{22}{\cancel{7}_{1}} \times \frac{\cancel{4.2}^{6}}{10} = \frac{132}{10} = 13.2 \text{ cm}$$

(d) $d = 5.6$ mm

$c = \pi d$

$$= \frac{22}{\cancel{7}_{1}} \times \frac{\cancel{56}^{8}}{10} = \frac{176}{10} \text{ mm} = 17.6 \text{ mm}$$

2. (a) $r = 31$ cm

$c = 2\pi l$

$$= 2 \times \frac{22}{7} \times 31 = \frac{1364}{7}$$

$$= 194.86 \text{ cm}$$

(b) $r = 6.3$ cm

$c = 2\pi r$

$$= 2 \times \frac{22}{\cancel{7}_{1}} \times \frac{\cancel{63}^{9}}{10} = \frac{396}{10}$$

$$= 39.6 \text{ cm}$$

(c) $r = 2.8$ mm

$C = 2\pi r$

$$= 2 \times \frac{22}{\cancel{7}} \times \frac{\cancel{28}^{4}}{10} = \frac{176}{10} \text{mm} = 17.6 \text{mm}$$

(d) $r = 7.2$ cm

$c = 2\pi r$

$= 2 \times \frac{22}{7} \times \frac{72}{10}$

$= \frac{3168}{70}$ cm

$= 45.26$ cm

3. (a) $c = 44$cm

$c = 2\pi r$

$44 = 2 \times \frac{22}{7} \times r$

$\frac{\overset{1}{\cancel{2}}\cancel{44} \times 7}{\underset{1}{\cancel{2}} \times \underset{1}{\cancel{22}}} = r$

$r = 7$ cm

(b) $C = 31.5$ cm

$2\pi r = 31.5$

$2 \times \frac{22}{7} \times r = 31.5$cm

$r = \frac{31.5 \times 7}{2 \times 22}$

$= \frac{220.5}{44}$ cm

$= 5.01$ cm

(c) $C = 126$ mm

$2\pi r = 126$

$r = \frac{126}{2\pi}$

$= \frac{\overset{63}{\cancel{126}} \times 7}{\underset{1}{\cancel{2}} \times 22} = \frac{\overset{441}{\cancel{882}}}{22 \times \cancel{2}}$

$= 20.05$ mm

4. Radius of circular pond $= 9.8$ m

Circumference $= 2\pi r$

$= 2 \times \frac{22}{7} \times 9.8$

$= \frac{431.2}{7}$ cm $= 61.6$ cm

5. Circumfernce of a circular park = 396 m

$$\pi d = 396$$

$$d = \frac{\overset{18}{\cancel{198}} \times 7}{\underset{1}{\cancel{22}}} = 126 \text{ m}$$

6. The cost of fence of 1 m = ₹ 60

Total cost = ₹ 26,400

$$\text{Circumference of circular field} = \frac{\text{total cost}}{\text{cost of 1m}}$$

$$= \frac{\overset{440}{\cancel{2640}\ \cancel{0}}}{\underset{1}{\cancel{6}\ \cancel{0}}} \text{m} = 440 \text{ m}$$

$$2\pi r = 440$$

$$r = \frac{\overset{10}{\cancel{220}}}{\underset{1}{\cancel{2}} \times \underset{1}{\cancel{22}}} = 70 \text{ m}$$

7. Diameter of a circular garden = 105m

Circumference of a circular garden = $2\pi r = \pi d$

$$= \frac{22}{\underset{1}{\cancel{7}}} \times \overset{15}{\cancel{105}} = 330 \text{ m}$$

If a man walks at the rate of 18m in 1 min

then a man walk of 1m in $\frac{1}{18}$ min

then a man walks 330 m in $\frac{1}{18} \times 330$ = 18.33 min.

8. The wire is in the shape of rectangle length = 40 cm

Breadth = 11 cm

Now the wire is bent into a circle.

So

Perimeter of rectangle = Circumference of the circle

$$2 (l + B) = 2\pi r$$

$$2 (40 + 11) = 2\pi r$$

$$2 (51) = 2\pi r$$

$$r = \frac{\cancel{2} \times 51}{\cancel{2}\pi}$$

$$= \frac{51\times 7}{22} = \frac{357}{22} = 16.23 \text{ cm}$$

$$\text{Area} = \pi r^2$$

$$= \frac{\cancel{22}}{\cancel{7}}\times\frac{51\times\cancel{7}}{\cancel{22}}\times\frac{51\times 7}{22} = \frac{51\times 51\times 7}{22}$$

$$= \frac{18207}{22}\text{cm}^2 = 827.59 \text{ cm}^2$$

9. (a) Area of shaded portion = Area of circle – Area of semicircle

$$= \pi r^2 - \frac{\pi r^2}{2}$$

$$= \pi r^2\left(1-\frac{1}{2}\right) = \frac{22}{7}\times\left(\frac{d}{2}\right)^2\left(\frac{1}{2}\right)$$

$$= \frac{1}{\cancel{2}_1}\times\frac{\overset{11}{\cancel{22}}}{\cancel{7}_1}\times\left(\frac{\overset{3}{\cancel{21}}}{\cancel{2}_1}\right)\left(\frac{\overset{21}{\cancel{42}}}{\cancel{2}_1}\right)$$

$$= 11 \times 3 \times 21 = 33 \times 21 = 693 \text{ cm}^2$$

(b) Shaded portion in I circle = $\frac{1}{4}$ of the circle

Area shaded portion in I circle = $\frac{1}{4}\times$ Area of circle = $\frac{1}{4}\pi r^2$

$$= \frac{1}{\cancel{4}_2}\times\frac{\overset{11}{\cancel{22}}}{\cancel{7}_1}\times\frac{\overset{5}{\cancel{35}}}{\cancel{10}_2}\times\frac{\overset{7}{\cancel{35}}}{\cancel{10}_2} = \frac{11\times 7}{8} = 9.625 \text{ cm}^2$$

Shaded portion in IInd circle = $\frac{3}{4}$ of the IInd circle

Area of shaded portion in IInd circle = $\frac{3}{4}\pi r^2$

$$= \frac{3}{\cancel{4}_2}\times\frac{\overset{11}{\cancel{22}}}{\cancel{7}_1}\times\frac{\overset{1}{\cancel{7}}}{\cancel{10}_2}\times\frac{\overset{7}{\cancel{35}}}{\cancel{10}_2} = \frac{3\times 11\times 7}{8}$$

$$= \frac{231}{8} = 28.875 \text{ cm}^2$$

Total Area = 9.625 + 28.875 = 38.500 cm^2

(c) Area of shaded part = $\frac{1}{2}\pi r^2$

$$= \frac{1}{\cancel{2}}\times\frac{\overset{11}{\cancel{22}}}{\cancel{7}_1}\times\frac{\overset{1}{\cancel{7}}}{\cancel{10}_2}\times\frac{\overset{7}{\cancel{35}}}{\cancel{10}_2}$$

$$= \frac{11\times 7}{4} = 19.25 \text{ m}^2$$

(d) Area of shaded portion $= \frac{1}{4}$ Area of circle

$= \frac{1}{4} \times \pi r^2 = \frac{1}{\cancel{4}_{1}} \times \frac{22}{\cancel{7}} \times \cancel{12}^{3} \times 12$

$= \frac{792}{7} = 113.14 \text{ cm}^2$

10. Area of circle $= \pi r^2$

$= \frac{22}{7} \times (7)^2 = 49\pi$

Area of hole $= \pi r^2 = \frac{22}{7} \times (1.5)^2$

$= (1.5)^2\pi = \frac{\cancel{15}^{3}}{\cancel{10}_{2}} \times \frac{\cancel{15}^{3}}{\cancel{10}_{2}}\pi = \frac{9}{4}\pi$

The area of the remaining plate $= 49\pi - \frac{9}{4}\pi$

$= \pi\left(\frac{196-9}{4}\right) = \frac{187}{4}\pi$

$= 46.75 \times \frac{22}{7} = 146.93 \text{ app. m}^2$

11. Radius of garden $= \frac{1428}{2} = 714\text{m}$

Radius of pond $= 196$ m

Area of land left out = area of garden – area of pond

$= (3.14 \times 714 \times 714) - (3.14 \times 196 \times 196)$

$= 3.14\ (509796 - 38416)$

$= 3.14 \times 471380 = 1480133.2 \text{ m}^2$

12. Area of cross section $= (\pi R^2 - \pi r^2) = \pi\ (R^2 - r^2)$

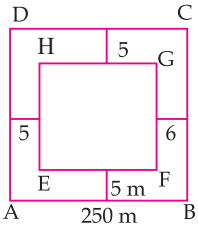
$= \pi\ (36 - 25) = \pi\ (11)$

$= 11\pi = 11 \times 3.14 = 34.54 \text{ cm}^2$

EXERCISE 11.4

1. Area of field = (side) × (side)

$= (250 \times 250) \text{ m}^2 = 62500 \text{ m}^2$



A road is wide is made all along the field inside it.

Length of small square = 250 – (5 + 5)

= 240m

Area of small square = $(240 \times 240) \text{ m}^2$

$= 57600 \text{ m}^2$

Area of road = Area of big square – Area of small square

$= (62500 - 57600)\ m^2$

$= 4900\ m^2$

2. Length of park $= 750m$

Breadth of park $= 450$

Area of park $= L \times B$

$= (750 \times 450)m^2$

$= 337500\ m^2$

Area of swimming pool $= 175 \times 80$

$= 14000\ m^2$

Area of remaining for grass $= (337500 - 14000)m^2$

$= 323500\ m^2$

Cost per m. square $=$ Rs 15

Total cost $=$ Rs (15×323500)

$=$ Rs 48,52,500

3. Given that, a wire when bent is able to enclose a square having area 484 cm^2

Area of square $= (side)^2$

$484 = a^2$

$a = 22$ cm

$\therefore$ the length of the wire $=$ 88 cm (Perimeter of square)

Now,

Given that the same wire is bent into a form of circle.

Circumference of circle $=$ length of the wise

$2\pi r = 88$ cm

$$r = \frac{\cancel{88}^{\cancel{44}^{2}} \times 7}{\cancel{2} \times \cancel{22}_{1}}$$

$= 14$ cm

Area of circle $= \pi r^2$

$$= \frac{22}{\cancel{7}} \times \cancel{14}^{2} \times 14$$

$= 22 \times 28$

$= 616\ cm^2$

4. Dimension of large rectangle $= 80 + 5 + 5 = 90$ m and

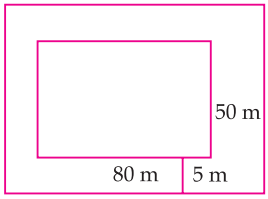
$= 50 + 5 + 5 = 60$ m

Area of large rectangle $= (90 \times 60)\ m^2$

$= 5400\ m^2$

Area of small rectangle $= 80 \times 50$

$= 4000\ m^2$



Area of Verandah = Area of large sec. – Area of small sec.

= 5400 – 4000 = 1400 m^2

Area of 1 tile = (40 × 40) cm^2

= 1600 cm^2

= $\frac{1600}{10000} m^2$ = 0.16 m^2

1 m = 100 cm

1 m^2 = 10000 cm^2

Tiles required = $\frac{\cancel{350}^{175}}{\cancel{1400}\ \cancel{16}_{\cancel{8}_{\cancel{4}_{2}}}} \times 100 = \frac{\cancel{17500}^{8750}}{\cancel{2}_{1}}$

= 8750 tiles.

5. Lenght = 825 m

Breadth = 375 m

Width of road = 4cm

Area of road along length = 825 × 4 = 3300 m^2

Area of road along Breadth = 375 × 4 = 1500 m^2

Area of the path = 3300 + 1500 = 4800 m^2

6. Length of picture = 75 – (2.5 + 2.5)

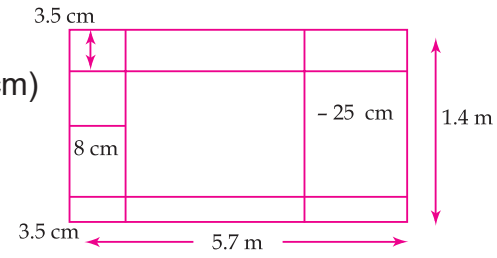
= 75 – 5 = 70 cm

Breadth of picture 40 – (5) = 35 cm

7. Area of zari =Area of outer rectangle – Area of a rectangle without zari

Area of sari = L × B

= 5.7 m × 1.4 m = 7.98 m^2



Length of a rectangle without zari = 5.7 m – (8 + 25 cm)

= 5.7 m – (32 cm)

= 5.7m – 0.32 m = 5.38 m

Breadth = 1.4m – (3.5cm + 3.5 cm)

= 1.4m – 7.0cm

= 1.4m – 0.07m = 1.33m

∴ Area of sari without zari = L × B

= 5.38 × 1.33 = 7.1554 m^2

So, Area of zari = Area of outer retangle – Area of retangle without zari

= 7.98 m – 7.1554 m^2

= 0.8246 m^2

NCERT CORNER

EXERCISE 11.1

1. (i) Area = L × B

= 500m × 300m = 150000 m^2

(ii) Cost of 1 m^2 land = Rs 10000

Cost of 150000 m^2 land = 10000 × 150000

= ₹ 1500000000

2. Perimeter = 320 m

4 × side = 320

$$\text{Side} = \frac{\overset{80}{\cancel{320}}}{\cancel{4}} = 80 \text{ m}$$

Lenght of the side of park = 80m

Area = $(\text{side})^2$

= $(80)^2 = 6400m^2$

3. Area = 440 m^2

L × B = 440

22 × B = 440

$$B = \frac{\overset{20}{\cancel{440}}}{\underset{1}{\cancel{22}}} = 20m$$

Perimeter = 2 (L × B)

= 2 (22 + 20)

= 2 (42) = 84 m

4. Perimeter = 2 (L + B) = 100 cm

2 (35 + B) = 100

B = 50 – 35 = 15 cm

Area = L × B

= 35 × 15 = 525 cm^2

5. Area of square park = $(60)^2 = 3600 m^2$

Area of rectangular park = L × B = 3600 m^2

= 90 × B = 3600

$$B = \frac{\overset{90}{\cancel{360}\,\cancel{0}}}{\underset{1}{\cancel{9}\,\cancel{0}}} = 40 \text{ m}$$

6. Perimeter of rectangle = Perimeter of square

2 (L + B) = 4 × side

$2(40 + 22) = 4$ side

$2(62) = 4$ side

$$\text{Side} = \frac{\cancel{2} \times \overset{31}{\cancel{62}}}{\underset{\cancel{2}}{\cancel{4}}} = 31\text{cm}$$

Area of rectangle $= 40 \times 22 = 880\ \text{cm}^2$

Area of square $= (\text{side})^2 = (31)^2 = 961\ \text{cm}^2$

$\therefore$ the square shaped wire enclose more area.

7. Perimeter $= 2(L + B) = 130$

$2(L + 30) = 130$

$$L + 30 = \frac{\overset{65}{\cancel{130}}}{\cancel{2}}$$

$L + 30 = 65$

$L = 65 - 30 = 35$ cm

Area $= L \times B = 35 \times 30$

$= 1050\ \text{cm}^2$

8. Area of wall $= 4.5 \times 3.6 = 16.2\ \text{m}^2$

Area of door $= 2 \times 1 = 2\ \text{m}^2$

Area to be white washed $= 16.2 - 2 = 14.2\ \text{m}^2$

Cost of white washed 1 m^2 area = ₹ 20

Cost of white washing 14.2 m^2 area = 14.2×20 = ₹ 284.

EXERCISE 11.2

1. Area of paralleloram = Base × Height

(a) H = 4cm, Base = 7 cm

Area of parallelogram $= 4 \times 7 = 28\ \text{cm}^2$

(b) H = 3 cm, Base = 5cm

Area of parallelogram $= 5 \times 3 = 15\ \text{cm}^2$

(c) H = 3.5 cm, B = 2.5 cm

Area $= (3.5 \times 2.5)\ \text{cm}^2 = 8.75\ \text{cm}^2$

(d) H = 4.8 m, B = 5 cm

Area = H × B = 4.8 × 5 = 24.0 cm

(e) H = 4.4 cm, B = 2 cm

Area $= 4.4 \times 2 = 8.8\ \text{cm}^2$

2. Area of $\Delta = \frac{1}{2} \times b \times h$

(a) H = 3 cm, B 4 cm

Area $= \frac{1}{2} \times 3 \times 4 = 6\text{cm}^2$

(b) H = 3.2 cm, B = 5 cm

$$\text{Area} = \frac{1}{\cancel{2}} \times \overset{1.6}{\cancel{3.2}} \times 5 = 8.0\text{cm}^2$$

(c) H = 4 cm, B = 3 cm

$$\text{Area} = \frac{1 \times \overset{2}{\cancel{4}}}{\cancel{2}} \times 3 = \frac{\overset{6}{\cancel{12}}}{\cancel{2}}\text{cm}^2 = 6\text{cm}^2$$

(d) H = 2 cm, B = 3 cm

$$\text{Area} = \frac{1}{\cancel{2}} \times \cancel{2} \times 3 = 3\ \text{cm}^2$$

3. (a) $H = \dfrac{\text{Area}}{B} = \dfrac{\overset{123}{\cancel{246}}}{\underset{10}{\cancel{20}}} = 12.3\ \text{cm}$

(b) $B = \dfrac{\text{Area}}{H} = \dfrac{154.5}{15} = 10.3\ \text{cm}$

(c) $B = \dfrac{\text{Area}}{H} = \dfrac{48.72}{8.4} = 5.8\ \text{cm}$

(d) $H = \dfrac{\text{Area}}{B} = \dfrac{16.38}{15.6} = 1.05\ \text{cm}$

4. (a) $\text{Area of triangle} = \dfrac{1}{2} \times B \times h$

$$87 = \frac{1}{2} \times 15 \times h$$

$$h = \frac{87 \times 2}{15} = 11.6\ \text{cm}$$

(b) $\text{Area} = \dfrac{1}{2} \times b \times h$

$$1256 = \frac{1}{2} \times B \times 31.4$$

$$B = \frac{1256 \times 2}{31.4} = 80\ \text{mm}$$

(c) $\text{Area of } \Delta = \dfrac{1}{2} \times b \times h$

$$170.5 = \frac{1}{2} \times 22 \times h$$

$$\frac{170.5 \times \cancel{2}}{\underset{11}{\cancel{22}}} = h$$

$$h = 15.5\ \text{cm}$$

5. (a) Area of parallelogram = B × H

= SR × QM = 7.6 × 12 = 91.2 cm^2

(b) Area of parallelogram = NQ × PS

91.2 = NQ × 8

$$NQ = \frac{91.2}{8}$$

NQ = 11.4 cm

6. Area of parallelogram = B × H = AB × DL

1470 cm^2 = 35 × DL

$$DL = \frac{\overset{42}{\cancel{294}}\ \cancel{1470}}{\underset{1}{\cancel{35}}} = 42 \text{ cm}$$

Also, Area of parallelogram = MB × DA

1470 = MB × 49

$$MB = \frac{1470}{49} = 30 \text{ cm}$$

7. $$\text{Area} = \frac{1}{2} \times b \times h$$

$$= \frac{1}{\cancel{2}_{1}} \times 5 \times \overset{6}{\cancel{12}} = 30 \text{ cm}^2$$

Also, $$\text{Area of } \Delta = \frac{1}{2} \times AD \times BC$$

$$30 = \frac{1}{2} \times AD \times 13$$

$$\frac{30 \times 2}{13} = AD$$

AD = 4.6 cm

8. $$\text{Area of } \Delta ABC = \frac{1}{2} \times B \times H$$

$$= \frac{1}{2} \times BC \times AD$$

$$= \frac{1}{\cancel{2}} \times 9 \times \overset{3}{\cancel{6}} = 27 \text{ cm}^2$$

$$\text{Area of } \Delta ABC = \frac{1}{2} \times B \times H$$

$$= \frac{1}{2} \times EC \times AB$$

$$27\ \text{cm}^2 = \frac{1}{2} \times \text{CE} \times 7.5\ \text{cm}$$

$$\text{CE} = \frac{\overset{9}{\cancel{27}} \times 2 \times \overset{2}{\cancel{10}}}{\underset{1}{\cancel{7.5}}} = \frac{36}{5} = 7.2\ \text{cm}$$

EXERCISE 11.3

1. (a) $r = 14\ \text{cm}$

$$C = 2\pi r$$

$$= \times \frac{22}{\cancel{7}} \times \cancel{14} = 88\ \text{cm}$$

(b) $r = 28\ \text{mm}$

$$C = 2\pi r$$

$$= 2 \times \frac{22}{\cancel{7}} \times \overset{4}{\cancel{28}} = 176\ \text{mm}$$

(c) $r = 21\ \text{cm}$

$$C = 2 \times \frac{22}{\cancel{7}} \times \overset{3}{\cancel{21}}$$

$$= 132\ \text{cm}$$

2. (a) $r = 14\ \text{mm}$

$$\text{Area} = \pi r^2$$

$$= \frac{22}{\cancel{7}} \times \overset{2}{\cancel{14}} \times 14$$

$$= 44 \times 14$$

$$= 616\ \text{mm}^2$$

(b) $\text{Diameter} = 49\ \text{m}$

$$r = \frac{49}{2}\text{m}$$

$$\text{Area} = \pi r^2$$

$$= \frac{\overset{11}{\cancel{22}}}{\underset{1}{\cancel{7}}} \times \frac{\overset{7}{\cancel{49}}}{\underset{1}{\cancel{2}}} \times \frac{49}{2} = 1886.5\ \text{m}^2$$

(c) $\text{Radius} = 5\ \text{cm}$

$$\text{Area} = \pi r^2$$

$$= \frac{22}{7} \times 5 \times 5$$

$$= \frac{550}{7} = 78.57\ \text{cm}^2$$

3. $C = 2\pi r = 154$ m

$2\pi r = 154$

$$\frac{22}{7} \times r = \frac{\overset{77}{\cancel{154}}}{\underset{1}{\cancel{2}}}$$

$$r = \frac{\overset{7}{\cancel{77}} \times 7}{\underset{2}{\cancel{22}}} = \frac{49}{2}$$

$\text{Area} = \pi r^2$

$$= \frac{\overset{11}{\cancel{22}}}{\underset{1}{\cancel{7}}} \times \frac{\overset{7}{\cancel{49}}}{\underset{1}{\cancel{2}}} \times \frac{49}{2} = 1886.5 \text{ m}^2$$

4. $d = 21$m

$$r = \frac{21}{2}\text{m}$$

$C = 2\pi r$

$$= \cancel{2} \times \frac{22}{\cancel{7}} \times \frac{\overset{3}{\cancel{21}}}{\cancel{2}} = 66 \text{ m}$$

Length of rope required for fencing = 2 × 66 m = 132 m

Cost of 1 m rope = ₹ 4

Cost of 132m rope = 4 × 132 = ₹ 528

5. Outer radius of circular sheet = 4 cm

Inner radius of circular sheet = 3 cm

Remaining area = 3.14 × 4 × 4 – 3.14 × 3 × 3 = 3.14 (16 – 9)

= 3.14 (7) = 21.98 cm^2

6. $C = 2\pi r$

$$= \cancel{2} \times 3.14 \times \frac{15}{\underset{10}{\cancel{20}}} = 4.71 \text{ m}$$

Cost of 1 m lace = ₹ 15

Cost of 4.71 m lace = ₹ 4.71 × 15 = ₹ 70.65

7. $r = 5$ cm

Length of curved part = πr

$$= \frac{22}{7} \times 5 = 15.71 \text{ cm}$$

Total perimeter = Length of curved part + Length of diameter

= 15.71 + 10 = 25.71 cm

8. $D = 1.6\ m$

$$r = \frac{1.6}{2} = 0.8\ m$$

$$\text{Area} = 3.14 \times 0.8 \times 0.8$$

$$= 2.0096\ m^2$$

Cost for polishing 1 m^2 area = ₹ 15

Cost for polishing 2.0096 m^2 area = 15 × 2.0096

= ₹ 30.14

9. $C = 2\pi r = 44cm$

$$r = \frac{\overset{1}{\cancel{44}} \times 7}{\underset{1}{\cancel{22}} \times \underset{1}{\cancel{2}}}$$

$$= 7\ cm$$

$$\text{Area} = \pi r^2$$

$$= \frac{22}{\cancel{7}} \times \cancel{7} \times 7$$

$$= 154\ cm^2$$

If the wire is bent into a square, then the length of each side would be = $\frac{44}{4}$ = 11cm

Area of square = $(11)^2 = 121\ cm^2$

∴ Circle encloses more area.

10. Area of bigger circle = πr^2

$$= \frac{22}{\cancel{7}} \times \overset{2}{\cancel{14}} \times 14$$

$$= 44 \times 14$$

$$= 616\ cm^2$$

Area of 2 small circle = $2\pi r^2$

$$= \cancel{2} \times \frac{\overset{11}{\cancel{22}}}{\underset{1}{\cancel{7}}} \times \frac{\overset{1}{\cancel{3.5}}}{\underset{1}{\cancel{10}}} \times \frac{\overset{7}{\cancel{3.5}}}{\underset{1}{\cancel{10}}}$$

$$= 77\ cm^2$$

Area of rectangle = L × B

$$= 3 \times 1 = 3\ cm^2$$

Remaining area of sheet = $(616 - 77 - 3)\ cm^2 = 536\ cm^2$

11. Area of square – shaped sheet = $(side)^2 = (6)^2 = 36\ cm^2$

Area of circle = $3.14 \times 2 \times 2 = 12.56\ cm^2$

Remaining area of sheet = $(36 - 12.56)\ cm^2$

= $23.44\ cm^2$

12. Circumference $= 2\pi r$

$31.4 \text{ cm} = 2 \times 3.14 \times r$

$$r = \frac{31.4 \times 100}{2 \times 3.14 \times 100}$$

$$= \frac{\cancel{3140}^{\,5\,\cancel{10}}}{\cancel{2 \times 314}_{\,1}} = 5$$

Area $= 3.14 \times (5)\,(5)$

$= 3.14 \times 25$

$= 78.5 \text{ cm}^2$

13. Radius of flower bed $= \frac{66}{2} = 33 \text{ m}$

Radius of flower bed and path together $= 33 + 4 = 37 \text{ m}$

Area of flower bed and path together $= 3.14 \times 37 \times 37$

$= 4298.66 \text{ m}^2$

Area of flower bed $= 3.14 \times 33 \times 33$

$= 3419.46 \text{ m}^2$

Area of path = Area of flower bed and path together – area of flower bed.

$= (4298.66 - 3419.46) \text{ m}^2$

$= 879.20 \text{ m}^2$

14. Area $= \pi r^2 = 314 \text{ m}^2$

$3.14 \times r^2 = 314$

$$r^2 = \frac{\cancel{314}^{\,1}}{\cancel{3.14}_{\,1}} \times 100$$

$= 100$

$r = 10 \text{ m}$

Yes, the sprinkler will water the whole garden.

15. Radius of outer circle $= 19\text{m}$

Circumference of outer circle $= 2\pi r$

$= 2 \times 3.14 \times 19 = 119.32 \text{ m}$

Radius of inner circle $= 19 - 10 = 9 \text{ m}$

Circumference of inner circle $= 2\pi r$

$= 2 \times 3.14 \times 9 = 56.52 \text{ m}$

16. $r = 28 \text{ cm}$

$C = 2\pi r$

$$= 2 \times \frac{22}{\cancel{7}_{1}} \times \cancel{28}^{4} = 176 \text{ cm}$$

$$\text{No. of rotations} = \frac{\text{Total distance to be covered}}{\text{Circumference of wheel}}$$

$$= \frac{352 \text{ m}}{176 \text{ cm}} = \frac{\cancel{35200}^{200}}{\cancel{176}_{1}} = 200$$

Therefore, it will rotate 200 times.

17. Distance travelled by the tip of minute hand = circumference of clock

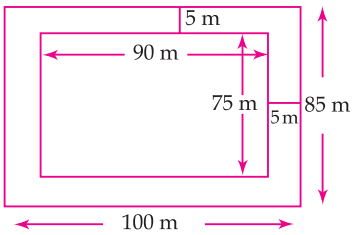
$$= 2\pi r = 2 \times 3.14 \times 15 = 94.2 \text{ cm}$$

EXERCISE 11.4

1. Length of garden = 90m

Breadth of garden = 75m

Area of garden = $l \times b = 90 \times 75 = 6750 \text{ m}^2$



From the fig. it can be observed that the new length and breadth of the garden, when path is also included are 100 m and 85 m respectively.

Area of the garden including the path = 100 × 85

$= 8500 \text{ m}^2$

Area of path = Area of garden including the path – Area of garden

$= (8500 - 6750) \text{ m}^2 = 1750 \text{ m}^2$

Therefore, area of garden in hectare = $\frac{6750}{10000}$ = 0.675 hec.

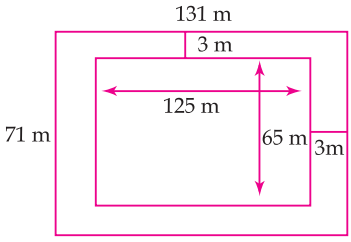
2. Length of park = 125 m

Breadth pf park = 65 m

Area of park = $l \times b$

$= 125 \times 65 \text{ m}^2$

$= 8125 \text{ m}^2$



Area of the park including the path = $131 \times 71 = 9301 \text{ m}^2$

Area of path = Area of park including the path – Area of park

$= (9301 - 8125) \text{ m}^2 = 1176 \text{ m}^2$

3. Length of cardboard = 8 cm

Breadth of cardboard = 5 cm

Area of cardboard including margin = $l \times b$

$= 8 \times 5$

$= 40 \text{ cm}^2$

Area of the cardboard not duding the margin = $l \times b$

$= 5 \times 2 = 10\ cm^2$

Area of margin = Area of cardboard including the margin – Area of cardboard not including margin

$= (40 - 10)\ cm^2 = 30\ cm^2$

4. (i) *l* of room = 5.5 m

B of room = 4 m

Area of room = $l \times b = 5.5 \times 4 = 22\ m^2$

l of room including the verandah = 10 m

B of room including the verandah = 8.5 m

Area of room including the verandah = $10 \times 8.5 = 85\ m^2$

Area of room verandah = Area of the room including the verandah – Area of room

$= (85 - 22)\ m^2 = 63\ m^2$

(ii) Cost of cementing 1 m^2 area of the floor of the verandah = ₹ 200

Cost of cementing 63 m^2 area of the floor of the verandah = 200 × 63 = ₹ 12600

5. (i) Side of square garden = 30 m

Area of square garden including path = $(30)^2 = 900\ m^2$

Side of the square garden not including the path = 28 m

Area of the square garden not including the path = $(28)^2\ m^2 = 784\ m^2$

Area of path = Area of square garden including path – Area of the square garden not including

$= (900 - 784)\ m^2 = 116\ m^2$

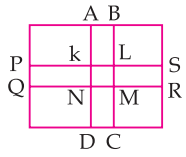
(ii) Cost of planting grass in 1 m^2 area of garden = ₹ 40

Cost of planting grass in 784 m^2 area of garden = 784 × 40 = ₹ 31360

6. l of park = 700 m

B of park = 300 m

Area of park = $l \times b = (700 \times 300)\ m^2 = 210000\ m^2$



l of road PQRS = 700 m

B of road ABCD = 300m

Width of each road = 10 m

Area of roads = ar (PQRS) + ar (ABCD) – ar (KLMN)

Area of the roads = $(700 \times 10) + (300 \times 10) - (10 \times 10)$

$= (7000 + 3000 - 100)\ m = 9900\ m^2 = 0.99$ hec.

Area of park excluding roads = 210000 – 9900

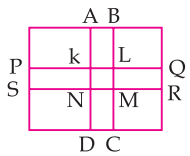
$= 200100\ m^2 = 20.01$ hec.

7. (i) L of field = 90 m

B of field = 60 m

Area of field = $90 \times 60 = 5400\ m^2$

Length of road PQRS = 90m



Length of road ABCD = 60m

Width of each road = 3m

Area of roads = ar (PQRS) + ar (ABCD) – ar (KLMN)

= (90 × 3) + (60 × 3) – (3 × 3)

= 270 + 180 – 9 = 441 m^2

(ii) Cost for constructing 1m^2 road = ₹ 110

Cost for constructing 441m^2 road = ₹ 110 × 441

= ₹ 48510.

8. r = 4 cm

Cicumference of circular pipe = $2\pi r$

= 2 × 3.14 × 4 = 25.12 cm

Side of square box = 4 cm

Perimeter of square box = 4 × side

= 4 × 4 = 16 cm

Yes, she have any cord left = (25.12 – 16) cm

= 9.12 cm

9. (i) Length of land = 10m

Breadth of land = 5m

Area of land = 10 × 5 = 50 m^2

(ii) r = 2 m

area of flower bed = πr^2

= 3.14 × 2 × 2 = 12.56 cm^2

(iii) Area of lawn excluding the area of the flower bed

= Area of land – Area of flower bed

= (50 – 12.56) m^2 = 37.44 m^2

(iv) Circumference of flower bed = $2\pi r$

= 2 × 3.14 × 2 = 12.56 m

10. (i) area of Rectangle ABCD = L × B

= 18 × 10 = 180 cm^2

Area of small triangle AEF = $\frac{1}{2} \times b \times h$

= $\frac{1}{\cancel{2}} \times 6 \times \overset{5}{\cancel{10}}$ = 30 cm^2

Area of Δ BCE = $\frac{1}{\cancel{2}} \times 10 \times \overset{4}{\cancel{8}}$ = 40 cm^2

Area of shaded portion = Area of rectangle – Area of Δ AEF – Area of Δ BCE

= (180 – 30 – 40) cm^2 = 110 cm^2

(ii) Area of PQRS = $(20)^2$ = 400 cm^2

$$\text{Area of } \Delta TSU = \frac{1}{2} \times \overset{5}{\cancel{10}} \times 10 = 50 \text{ cm}^2$$

$$\text{Area of } \Delta QRU = \frac{1}{2} \times 10 \times \overset{10}{\cancel{20}} = 100 \text{ cm}^2$$

$$\text{Area of } \Delta PTQ = \frac{1}{2} \times 10 \times \overset{10}{\cancel{20}} = 100 \text{ cm}^2$$

$$\text{Area of shaded portion} = (400 - 50 - 100 - 100) \text{ cm}^2$$
$$= (400 - 250) \text{ cm}^2$$
$$= 150 \text{ cm}^2$$

11.
$$\text{Area of } \Delta ABC = \frac{1}{2} \times AC \times BM = \frac{1}{2} \times \overset{11}{\cancel{22}} \times 3$$
$$= 33 \text{ cm}^2$$

$$\text{Area of } \Delta ADC = \frac{1}{2} \times AC \times DN$$
$$= \frac{1}{2} \times \overset{11}{\cancel{22}} \times 3 = 33 \text{ cm}^2$$

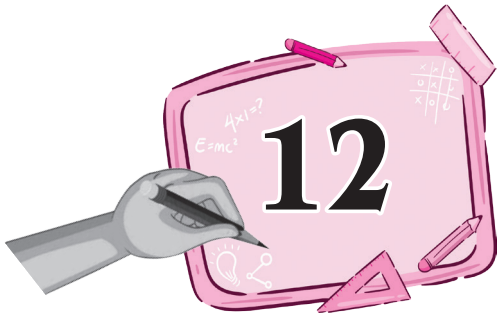
$$\text{Area of quad ABCD} = \text{Area of } \Delta ABC + \text{Area of } \Delta ADC$$
$$= (33 + 33) \text{cm}^2$$
$$= 66 \text{ cm}^2$$

SUBJECT ENRICHMENT EXERCISE

I. 1. $6\pi x^2$ 2. 7 cm
3. 2 times 4. 48 cm^2
5. None of those 6. Square
7. $4x^2$ 8. $6x$
9. 10,000

II. (1) 3:1 (2) 11
(3) $4x^2$ (4) 64π m^2
(5) 1

III. (1) False (2) False
(3) False (4) False
(5) False



Algebraic Expression

EXERCISE 12.1

1. (a) Term = x^3, $-3y$
Factor = x , x, x ; -3, y

(b) Term = $3xy^2$; $5x^2y$
Factor = 3, x, y, y ; 5, x, x, y

(c) Term = $-5x^2$; $3xyz$
Factor = – 5, x, x; 3, x, y, z

(d) Term = $5y^2x$; $7z$
Factor = 5, y, y, x ; 7, z

(e) Term = $-8xy$; $5y^2$
factor = – 8, x, y ; 5, y, y

(f) $32x^2y + 24yx^2$
Term = $32x^2y$; $24yx^2$
Factor = 32, x, x, y; 23, y, x, x,

(g) Term = $-14xy$; $7y^2z$
Factor = -14, x, y ; $7y$, y, z

(h) Term = $5x^2$; $7x$; -5
Factor = 5, x, x ; 7, x ; – 5

2. (a) $6a + a^3$

(b) $ab + (a - b)$

(c) $(a + b) + ab$

(d) $a + 7b$

(e) $2a + b$

(f) $8 + xy$

(g) $a\,(b + 5)$

(h) $12 - 5a$

3.

Expression	Terms	Cofficients
(a) 3 – 5y	–5y	–5
(b) $5x^2 - 7xyz - 8$	$5x^2$ $-7xyz$	5 – 7
(c) $-12xy^2 + 8xy - 6$	$-12xy^2$ 8xy	–12 8
(d) $7a + 14a^2b$	7a $14a^2b$	7 14
(e) 5 (l + b + b)	5l 10b	5 10
(f) $7x^2y + 5xy$	$7x^2y$ 5xy	7 5
(g) $9a^2b + 6$	$9a^2b$	9
(h) $-m^2n + 12mn$	$-m^2n$ 12mn	–1 12

4.

Expression	Terms with x	Cofficient of x
(a) $4xy^2 + 3xy$	$4xy^2$, $3xy$	$4y^2$, $3y$
(b) $-x^2y + 7x$	$+7x$	$-$ 7
(c) $5yz + zx^2 + 3xy$	$3xy$	$3y$
(d) $1 + x + x^2y$	x	1
(e) $6xy^2 + 12xy$	$6xy^2$ $12xy$	$6y^2$ $12y$
(f) $x + 5y + 6z$	x	1

5.

Expression	Term with y	Cofficient of y
(a) $-6xy^2 + 3xz$	$-6xy$	$-6x$
(b) $-7xy + 4y^2$	$-7xy$	$-7x$
(c) $-8yz + 12y^2z$	$-8yz$	$-8z$
(d) $-5x^2y^2 + 10xyz$	$10xyz$	$10xz$
(e) $75x + 205y^2$	0	0
(f) $65yx^2 + 115y^2x^2$	$65x^2y$	$65x^2$

6. (a) $2xy, -8xy$

(b) $7x^2yz, -4x^2yz, 8x^2yz$

$5xy^2, 2xy^2$

(c) $\frac{2}{5}ab^2c, \quad -\frac{1}{3}ab^2c$

(d) $-12xy, 7xy$

7. (a) Binomial

(b) Monomial

(c) Binomial

(d) Binomial

(e) Monomial

(f) Monomial

(g) Trinomial

8. (a) Coefficient of x in $7x^2y = 0$

(b) Coefficient of $x^2 = 15y$

(c) Coefficient of $y^2 = 7x^2$

(d) Coefficient of $a = 8b^2$

(e) Coefficient of $x^2y^2 = 6$

(f) Coefficient of $b^2 = 5ac$

(g) Coefficient of $ac = 7b$

(h) Coefficient of $x^3 = 5$

9. (a) the degree of this polynomial = 4

(b) The degree of this polynomial = 1 + 7 = 8

(c) The degree of this polynomial = 2 + 1 + 3 = 6

(d) The degree of this polynomial = 1

(e) The degree of this polynomial = 0

EXERCISE 12.2

1. (a) $8s^2, -5s^2$

$8s^2 + (-5s^2) = 8s^2 - 5s^2 = 3s^2$

(b) $7ab, 6ab, -11ab$

$7ab + 6ab + (-11ab) = 13ab - 11ab = 2ab$

(c) $8x^2y + (-12x^2y) + (-5x^2y) = 8x^2y + (-17x^2y) = -9x^2y$

(d) $x + y + 2x - y + 3x - y = (x + 2x + 3x) + (y - y - y) = 6x - y$

(e) $2a^2 + 4a + 5a^2 - 3a + 2a - 5a^2$

$= (2a^2 + 5a^2 - 5a^2) + (4a - 3a + 2a)$

$= 2a^2 + 3a$

2. (a) $5a + 2b + 6a + 7b = 11a + 9b$

(b) $7x - 2y + 3x - 8y = 4x - 10y$

(c) $-7s - 5t + 10s + 6t = 3s + t$

(d) $-3w + 9n + 7w - 12n = 4w - 3n$

3. (a) $(5a + b) + (4a + 2b) + (2a - b)$

$$\begin{array}{r} 5a+b \\ 4a+2b \\ +\quad 2a-b \\ \hline 11a+2b \\ \hline \end{array}$$

(b) $(4x - 2) + (3x + 4) + (5x - 3) + (3x + 6)$

$= (4x + 3x + 5x + 3x) + (-2 + 4 - 3 + 6)$

$= 15x + 5$

(c)
$$\begin{array}{r} 2x+3y+4z \\ +\quad 5x+3y+6z \\ \hline 7x+6y+10z \\ \hline \end{array}$$

(d)
$$\begin{array}{r} 2a+4b+7 \\ 8a-2b+3 \\ +\quad -5a-6b-5 \\ \hline 5a-4b+5 \\ \hline \end{array}$$

(e)
$$\begin{array}{r} x-y-2z \\ 4x+6y-2z \\ +\quad -2x-7y+9z \\ \hline 3x-2y+5z \\ \hline \end{array}$$

4. (a)
$$\begin{array}{r} 4x^2+7y \\ 5x^2+4y \\ -\quad\quad - \\ \hline -x^2+3y \\ \hline \end{array}$$

(b) $5m^2 \quad -9$

$-3m^2 + 6m + 3$

$+ \quad - \quad -$

$8m^2 - 6m - 12$

(c) $7x + 8y + 6z$

$5x \quad -3z$

$+ \quad +$

$2x + 8y \quad 9z$

(d) $4a^2 - 6b + 8c$

$-5a^2 + 4b - 12c$

$+ \quad - \quad +$

$9a^2 - 10b + 20c$

5. Length of First pipe = $3x + 5$

Length of second pipe = $+ 5x - 7$

Total length of pipe = $8x - 2$

6. $8x^2 + 6xy + 5y$

$5x^2 + xy + 2y$

$- \quad - \quad -$

$3x^2 + 5xy + 3y$

7. $3a^2 - 4b^2 + 5ab$

$-a^2 - 3b^2 + 7ab$

$+ \quad + \quad -$

$4a^2 - b^2 - 2ab$

8. Sum of $3x - 2y + 8$ and $-y - 8$

$\Rightarrow \quad 3x - 2y + 8 - y - 8 = 3x - 3y + 0$

Sub $5x - 2y - 11$ from $3x - 3y$

$(3x - 3y) - (5x - 2y - 11) = 3x - 3y - 5x + 2y + 11$

$= -2x - y + 11$

9. Shekhar spend money on book = $5x + 7y$

Shekhar spend money on short = $8x - 3y$

Total money = $5x + 7y + 8x - 3y = 13x + 4y$

$\therefore$ He spend in all = $13x + 4y$ rupees

10. Perimeter of triangle = $(2x^2 + 4x + 6) + (x^2 + 8) + (8x^2 - 5x + 10)$

$= 2x^2 + 4x + 6 + x^2 + 8 + 8x^2 - 5x + 10$

$= 11x^2 - x + 24$

11. Perimeter of triangle $= (5x + y) + (4x + 3y) + (7x + y)$

$= 5x + y + 4x + 3y + 7x + y = 16x + 5y$

12. Travelled by bus $= x^2 + 5x + 3$

Travelled by train $= 2x^2 + 3x - 5$

Total distance traveled by Deepak $= (x^2 + 5x + 3) + (2x^2 + 3x - 5)$

$= x^2 + 2x^2 + 5x + 3x + 3 - 5 = 3x^2 + 8x - 2$

13. Length $= 5m + n$

Breadth $= 8m + 2n$

Perimeter of rectangle $= 2\,[(5m + n) + (8m + 2n)]$

$= 2\,[5m+n + 8m + 2n] = 2\,[13m + 3n]$

Perimeter of rectangle $= 26m + 6n$

14. Side of square $= (5x + 3)$m

Perimeter $= 4$ (side)

$= 4\,(5x + 3) = (20x + 12)$ m

15. Side of equilateral triangle $= (4a + 5b)$m

Perimeter $= 3$ (side)

$= 3\,(4a + 5b) = (12a + 15b)$m

16.

$$\begin{array}{r} 4a^2 - 2b + 7 \\ -2a^2 + 6b + 9 \\ + \quad - \quad - \\ \hline 6a^2 - 8b - 2 \end{array}$$

17.

$$\begin{array}{cccc} 3x^2 & -5x & & -6 \\ x^2 & +5 & & -2ax \\ - & - & & + \\ \hline 2x^2 & -5x & -11 & +2ax \end{array}$$

$2x^2 - 5x + 2ax - 11$

$2x^2 - x(5 - 2a) - 11$

$= 2x^2 + x\,(2a - 5) - 11$

EXERCISE 12.3

1. (a) $y^2 - y - 7$ $(y = -2)$

$= (-2)^2 - (-2) - 7 = 4 + 4 - 7 = 1$

(b) $3xy + 2x - 2y$ $(x = 1, y = -1)$

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

(c) $p^2q^2 + 2p^2q - 3pq$ $(p = 1, q = -1)$

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

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

$= 1 - 2 + 3 = 2$

(d) $\frac{a}{5} - \frac{b}{10} + ab \quad (a = -2, b = 2)$

$= \frac{-2}{5} - \frac{2}{10} + (-2)(2)$

$= \frac{-2}{5} - \frac{2}{10} - 4$

$\frac{-4-2-40}{10} = \frac{-\cancel{46}^{23}}{\cancel{10}} = \frac{-23}{5}$

(e) $-p^2 + 5p + 7 \qquad (p = 4)$

$-(4)^2 + 5(4) + 7$

$-16 + 20 + 7 = 11$

(f) $-6y^3 - 5y - 9 \qquad (y = -2)$

$-6(-2)^3 - 5(-2) - 9$

$-6(-8) + 10 - 9$

$= 48 + 10 - 9 = 49$

(g) $3x^2 + 7xy^2 - xy \qquad (x = 1, y = 2)$

$= 3\,(1)^2 + 7(1)\,(2)^2 - (1)\,(2)$

$= 3 + 7(4) - 2$

$= 3 + 28 - 2 = 29$

(h) $4a + 6 - 7ac + b \qquad (a = 3, b = -1, c = 5)$

$= 4(3) + 6 - 7\,(3)\,(5) + (-1)$

$= 12 + 6 - 105 - 1$

$= 18 - 106$

$= -88$

2. (a) $5\,(x - a) + 2\,(a - x) \qquad [x = 3, a = -3]$

$= 5\,(3 + 3) + 2\,(-3 - 3)$

$= 5\,(6) + 2(-6)$

$= 30 - 12 = 18$

(b) $-4\,(p + q) + 2\,(2p + q) - 4q + 7 \qquad [p = -1, q = 3]$

$-\cancel{4p} - 4q + \cancel{4p} + 2q - 4q + 7$

$-8q + 2q + 7 = -6q + 7$

$-6\,(+3) + 7 = -18 + 7 = -11$

(c) $6a - \{2a - (5 - a) + 4\} \qquad (a = 4)$

$= 6a - \{2a - 5 + a + 4\}$

$= 6a - \{3a - 1\}$

$= 6a - 3a + 1 = 3a + 1$

$= 3(4) + 1 = 12 + 1 = 13$

(d) $-y + [5x - \{2y - (3x - 5y)\}]$ $(x = 3, y = -2)$

$-y + [5x - \{2y - 3x + 5y\}]$

$-y + [5x - \{-3x + 7y\}]$

$-y + [5x + 3x - 7y]$

$-y + 8x - 7y = -8y + 8x$

$= -8(-2) + 8(3)$

$= 16 + 24 = 40$

3. $13ax^2y - 15a^2xy + 16ax^2y - 14axy^2 + 17a^2xy - 13axy^2$

$= (13ax^2y + 16ax^2y) + (-15a^2xy + 17a^2xy) + (-14axy^2 - 13axy^2)$

$= 29ax^2y + 2a^2xy - 27axy^2$

$= 29(1)(-1)^2(2) + 2(1)^2(-1)(2) - 27(1)(-1)(2)^2$

$= 29(2) + 2(-2) - 27(-4)$

$= 58 - 4 + 108$

$= 162$

4.
$$\begin{aligned} p &= 2(l + b) \\ l &= 35 \text{ cm} \\ B &= 20 \text{ cm} \\ P &= 2(35 + 20) \\ &= 2(55) = 110 \text{ cm} \end{aligned}$$

5. $7y^2 - 3y - k = 35 \quad (y = -2)$

$7(-2)^2 - 3(-2) - k = 35$

$7(4) + 6 - k = 35$

$28 + 6 - k = 35$

$34 - 35 = k$

$-1 = k$

6.
$$\begin{aligned} P &= 3x^2 + 7x + 8 \\ Q &= 2x^2 + x - 9 \\ R &= -5x^2 - 8x + 1 \end{aligned}$$

$P + Q + R = 0$

$(3x^2 + 7x + 8) + (2x^2 + x - 9) + (-5x^2 - 8x + 1) = 0$

$3x^2 + 7x + 8 + 2x^2 + x - 9 - 5x^2 - 8x + 1 = 0$

$(3x^2 + 2x^2 - 5x^2) + (7x + x - 8x) + (8 - 9 + 1) = 0$

$0 + 0 + 0 = 0$

$0 = 0$

L.H.S. = R.H.S

7. $P^2 - 2p - 1000$

$(-100)^2 - 2(-100) - 1000$

$10000 + 200 - 1000 = 9200$

8. $a^2 + 2a^2(b^2 - 4) - a^2b^2 - b^2 = a^2 + 2a^2b^2 - 8a^2 - a^2b^2 - b^2$

$= -7a^2 + a^2b^2 - b^2$

$= -7(5)^2 + (5)^2(-5)^2 - (-5)^2$

$= -7(25) + 25(25) - 25$

$= -175 + 625 - 25$

$= -200 + 625 = 425$

EXERCISE 12.4

1. No. of line required $= 6 + 5(x - 1)$

$= 6 + 5x - 5 = 1 + 5x$

where x no. of house

$\therefore$ for 10 houses, no. of sticks required $= 1 + 5(10)$

$= 51$

2. (a) No. of lines required $= 4 + 6(x - 1)$

$= 4 + 6x - 6$

$= 6x - 2$

Where x = no. of patterens

$\therefore$ for 10 patterns, no. of sticks required $= 6x - 2$

$= 6(10) - 2$

$= 60 - 2$

$= 58$

3. (a) $c = n \times p$

(b) $s = c + p$

(c) $A + B + C = 180°$

(d) Area $= a \times a = a^2$

(e) $a = l \times b$

NCERT CORNER

EXERCISE 12.1

1. (i) $y - z$

(ii) $\frac{1}{2}(x + y)$

(iii) z^2

(iv) $\frac{1}{4}(pq)$

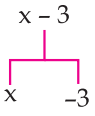
(v) $x^2 + y^2$

(vi) $5 + 3mn$

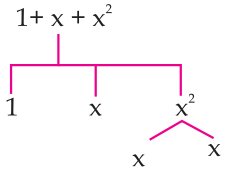
(vii) $10 - yz$

(viii) $ab - (a + b)$

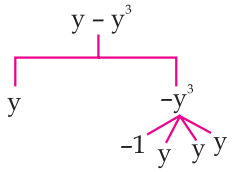
2. (i) (a) $x - 3$



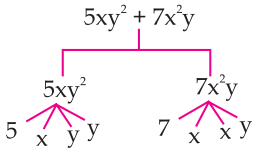
(b) $1 + x + x^2$



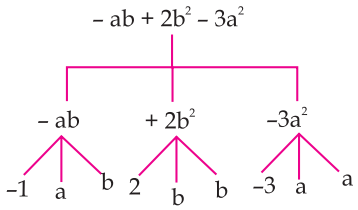
(c) $y - y^3$



(d) $5xy^2 + 7x^2y$



(e) $-ab + 2b^2 - 3a^2$



(ii)

Expression	Term	factors
(a) $-4x + 5$	$-4x$ 5	$-4, x$ 5
(b) $-4x + 5y$	$-4x$ $5y$	$-4, x,$ $5, y$
(c) $5y + 3y^2$	$5y$ $3y^2$	5,y 3,y,y
(d) $xy + 2x^2y^2$	xy $2x^2y^2$	x, y $2, x, x, y, y$
(e) $Pq + q$	Pq q	p, q q
(f) $1.2\,ab - 2.4b + 3.6\,a$	$1.2\,ab$ $-2.4b$ $3.6a$	$1.2, a, b$ $-2.4, b$ $3.6, a$
(g) $\frac{3}{4}x + \frac{1}{4}$	$\frac{3}{4}x$ $\frac{1}{4}$	$\frac{3}{4}, x$ $\frac{1}{4}$
(h) $0.1p^2 + 0.2q^2$	$0.1p^2$ $0.2q^2$	$0.1, p, p$ $0.2, q, q$

3.

Expression	Terms	Coefficient
(i) $5 - 3t^2$	$-3t^2$	-3
(ii) $1 + t + t^2 + t^3$	$1t$ t^2 t^3	1 1 1

(iii) $x + 2xy + 3y$	x $2xy$ $3y$	1 2 3
(iv) $100m + 1000n$	$100m$ $1000n$	100 1000
(v) $-p^2q^2 + 7pq$	$-p^2q$ $7pq$	–1 7
(vi) $1.2a + 0.8b$	$1.2\ a$ $0.8\ b$	1.2 0.8
(vii) $3.14r^2$	$3.14r^2$	3.14
(viii) $2\ (l + b)$	$2l$ $2b$	2 2
(ix) $0.1y + 0.01y^2$	$0.1y$ $0.01\ y^2$	0.1 0.01

4. (a)

Expression	Term with x	Cofficient
(i) $y^2x + y$	y^2x	y^2
(ii) $13y^2 - 8yx$	$-8yx$	$-8y$
(iii) $x + y + 2$	x	1
(iv) $5 + z + zx$	zx	z
(v) $1 + x + xy$	x, xy	1, y
(vi) $12xy^2 + 25$	$12xy^2$	$12y^2$
(vii) $7x + xy^2$	$7x$, xy^2	7, y^2

(b)

Expression	Terms with y^2	Cofficient y^2
(i) $8 - xy^2$	$-xy^2$	$-x$
(ii) $5y^2 + 7x$	$5y^2$	5
(iii) $2x^2y - 15xy^2 + 7y^2$	$-15xy^2$, $7y^2$	$-15\ x$, 7

5. (i) Binomial (ii) Monomial (iii) Trinomial (iv) Monomial
(v) Trinomial (vi) Binomial (vii) Binomial (viii) Monomial
(ix) Trinomial (x) Binomial (xi) Binomila (xii) Trinomial

6. (i) Like term (ii) Like term (iii) Unlike term (iv) Like term
(v) Unlike term (vi) Unlike term

7. (a) $-xy^2$, $2xy^2$
$-4yx^2$, $20x^2y$
$8x^2$, $-11x^2$, $-6x^2$
$+7y$, y
$-100x$, $3x$
$-11xy$, $2xy$

(b) $10pq$, $-7pq$, $78qp$
$7p$, $2405p$
$8q$, $-100q$
$-p^2q^2$, $12p^2q^2$
-23, 41
$-5p^2$, $701p^2$
$13p^2q$, qp^2

EXERCISE 12.2

1. (i) $21b - 32 + 7b - 20b = 21b + 7b - 20b - 32$

$= 28b - 20b - 32$

$= 8b - 32$

(ii) $-z^2 + 13z^2 + 7z^3 - 5z - 15z = 12z^2 + 7z^3 - 20z$

$= 7z^3 + 12z^2 - 20z$

(iii) $P - (p - q) - q - (q - p) = \cancel{p} - \cancel{p} + \cancel{q} - \cancel{q} - q + p = p - q$

(iv) $3a - 2b - ab - a + b - ab + 3ab + b - a$

$= a - \cancel{2b} + \cancel{2b} + ab = a + ab$

(v) $5x^2y - 5x^2 + 3yx^2 - 3y^2 + x^2 - y^2 + 8xy^2 - 3y^2$

$= 8x^2y - 4x^2 - 7y^2 + 8xy^2$

(vi) $3y^2 + 5y - \cancel{4} - 8y + y^2 + \cancel{4} = 4y^2 - 3y$

2. (i) $3mn + (-5mn) + 8mn + (-4mn)$

$= 3mn - 5mn + 8mn - 4mn = 2mn$

(ii) $t - 8tz, 3tz - z, z - t$

$= \cancel{t} - 8tz + 3tz - \cancel{z} + \cancel{z} - \cancel{t} = -5tz$

(iii) $-7mn + 5 + 12mn + 2 + 9mn - 8 + [-2mn - 3]$

$= (-7mn + 12mn + 9mn - 2mn) + (5 + 2 - 8 - 3)$

$= 12mn - 4$

(iv) $\cancel{a} + b - \cancel{3} + \cancel{b} - \cancel{a} + \cancel{3} + a - \cancel{b} + 3$

$= a + b + 3$

(v) $14x + \cancel{10y} - \cancel{12xy} - 13 + 18 - 7x - \cancel{10y} + \cancel{8xy} + \cancel{4xy}$

$= 7x + 5$

(vi) $5m - 7n + 3n - 4m + 2 + 2m - 3mn - 5$

$= 3m - 4n - 3 - 3mn$

(vii) $4x^2y + (-3xy^2) + (-5xy^2) + 5x^2y$

$= 4x^2y - 3xy^2 - 5xy^2 + 5x^2y$

$= 9x^2y - 8xy^2$

(viii) $\cancel{3p^2q^2} - 4pq + 5 - \cancel{10p^2q^2} + 15 + 9pq + \cancel{7p^2q^2}$

$= 5pq + 20$

(ix) $\cancel{ab} - \cancel{4a} + \cancel{4b} - \cancel{ab} + \cancel{4a} - \cancel{4b} = 0$

(x) $\cancel{x^2} - \cancel{y^2} - \cancel{1} + \cancel{y^2} - 1 - \cancel{x^2} + \cancel{1} - x^2 - y^2$

$= -x^2 - y^2 - 1$

3. (i) $y^2 - (-5y^2) = y^2 + 5y^2 = 6y^2$

(ii) $-12xy - 6xy = -18xy$

(iii) $(a + b) - (a - b) = \cancel{a} + b - \cancel{a} + b = 2b$

(iv) $b\,(5 - a) - a(b - 5)$

$= 5b - ab - ab + 5a$

$= 5a + 5b - 2ab$

(v) $4m^2 - 3mn + 8 - (-m^2 + 5mn)$

$= 4m^2 - 3mn + 8 + m^2 - 5mn$

$= 5m^2 - 8mn + 8$

(vi) $(5x - 10) - (-x^2 + 10x - 5)$

$= 5x - 10 + x^2 - 10x + 5$

$= x^2 - 5x - 5$

(vii) $3ab - 2a^2 - 2b^2 - (5a^2 - 7ab + 5b^2)$

$= 3ab - 2a^2 - 2b^2 - 5a^2 + 7ab - 5b^2$

$= -7a^2 - 7b^2 + 10ab$

(viii) $5p^2 + 3q^2 - pq - 4pq + 5q^2 + 3p^2$

$= 8p^2 + 8q^2 - 5pq$

4. (a) $2x^2 + 3xy - (x^2 + xy + y^2)$

$= 2x^2 + 3xy - x^2 - xy - y^2$

$= x^2 + 2xy - y^2$

(b) $(2a + 8b + 10) - (-3a + 7b + 16)$

$= 2a + 8b + 10 + 3a - 7b - 16$

$= 5a + b - 6$

5. $(3x^2 - 4y^2 + 5xy + 20) - (-x^2 - y^2 + 6xy + 20)$

$= 3x^2 - 4y^2 + 5xy + \cancel{20} + x^2 + y^2 - 6xy - \cancel{20}$

$= 4x^2 - 3y^2 - xy$

6. (a) Sum of $3x - y + 11$ and $-y - 11$

$3x - y + \cancel{11} - y - \cancel{11}$

$3x - 2y$

Sub. $3x - y - 11$ from $3x - 2y$

$\cancel{3x} - 2y - \cancel{3x} + y + 11 = -2y + y + 11$

$= -y + 11 = 11 - y$

(b) $(4 + 3x) + (5 - 4x + 2x^2) = 4 + 3x + 5 - 4x + 2x^2$

$= 2x^2 - x + 9$

$(3x^2 - 5x) + (-x^2 + 2x + 5) = 3x^2 - 5x - x^2 + 2x + 5$

$= 2x^2 - 3x + 5$

Sub. $2x^2 - 3x + 5$ from $2x^2 - x + 9$

$\cancel{2x^2} - x + 9 - \cancel{2x^2} + 3x - 5 = 2x + 4$

EXERCISE 12.3

1. (i) $m - 2 = 2 - 2 = 0$

(ii) $3m - 5 = 3(2) - 5 = 6 - 5 = 1$

(iii) $9 - 5m = 9 - 5(2) = 9 - 10 = -1$

(iv) $3m^2 - 2m - 7 = 3(2)^2 - 2(2) - 7$

$= 12 - 4 - 7 = 1$

(v) $\frac{5m}{2} - 4 = \frac{5(2)}{2} - 4 = 5 - 4 = 1$

2. (i) $4p + 7 = 4(-2) + 7 = -1$

(ii) $-3p^2 + 4p + 7 = -3(-2)^2 + 4(-2) + 7$

$= -3(4) + 4(-2) + 7$

$= -12 - 8 + 7 = -13$

(iii) $-2p^3 - 3p^2 + 4p + 7 = -2(-2)^3 - 3(-2)^2 + 4(-2) + 7$

$= -2(-8) - 3(4) - 8 + 7$

$= 16 - 12 - 1 = 3$

3. (i) $2x - 7 = 2(-1) - 7 = -2 - 7 = -9$

(ii) $-x + 2 = (-1) + 2 = 3$

(iii) $x^2 + 2x + 1 = (-1)^2 + 2(-1) + 1 = 1 - 2 + 1 = 0$

(iv) $2x^2 - x - 2 = 2(-1)^2 - (-1) - 2 = 2(1) + 1 - 2 = 1$

4. (i) $a^2 + b^2 = (2)^2 + (-2)^2 = 4 + 4 = 8$

(ii) $a^2 + ab + b^2 = (2)^2 + (2)(-2) + (-2)^2 = \cancel{4} - \cancel{4} + 4 = 4$

(iii) $a^2 + b^2 = (2)^2 - (-2)^2 = 4 - 4 = 0$

5. (i) $2a + 2b = 2(0) + 2(-1) = 0 - 2 = -2$

(ii) $2a^2 + b^2 + 1 = 2(0)^2 + (-1)^2 + 1 = 0 + 1 + 1 = 2$

(iii) $2a^2b + 2ab^2 + ab = 2(0)^2(-1) + 2(0)(-1)^2 + (0)(-1)$

$= 0 + 0 + 0 = 0$

(iv) $a^2 + ab + 2 = (0)^2 + (0)(-1) + 2 = 2$

6. (i) $x + 7 + 4(x - 5) = x + 7 + 4x - 20$

$= 5x - 13 = 5(2) - 13 = -3$

(ii) $3(x + 2) + 5x - 7$

$= 3x + 6 + 5x - 7$

$= 8x - 1 = 8(2) - 1 = 15$

(iii) $6x + 5(x - 2)$

$= 6x + 5x - 10$

$= 11x - 10 = 11(2) - 10 = 22 - 10 = 12$

(iv) $4(2x - 1) + 3x + 11$

$= 8x - 4 + 3x + 11$

$= 11x + 7 = 11(2) + 7 = 22 + 7 = 29$

7. (i) $3x - 5 - x + 9 = 2x + 4 - 2(3) + 4 = 10$

(ii) $2 - 8x + 4x + 4 = 6 - 4x = 6 - 4(3) = 6 - 12 = -6$

(iii) $3a + 5 - 8a + 1 = -5a + 6 = -5(-1) + 6 = 5 + 6 = 11$

(iv) $10 - 3b - 4 - 5b = 6 - 8b = 6 - 8(-2) = 6 + 16 = 22$

(v) $2a - 2b - 4 - 5 + a = 3a - 2b - 9 = 3(-1) - 2(-2) - 9$

$= -3 + 4 - 9 = -8$

8. (i) $z^3 - 3z + 30$

$= (10)^3 - 3(10) + 30$

$= 1000 - 30 + 30 = 1000$

(ii) $p^2 - 2p - 100$

$= (-10)^2 - 2(-10) - 100$

$= 100 + 20 - 100 = 20$

9. $2x^2 + x - a = 5$

$2(0)^2 + (0) - a = 5$

$a = -5$

10. $2(a^2 + ab) + 3 - ab$

$= 2a^2 + 2ab + 3 - ab$

$= 2a^2 + ab + 3$

$= 2(5)^2 + (5)(-3) + 3$

$= 2(25) - 15 + 3 = 50 - 12 = 38$

EXERCISE 12.4

1. (a) It is given that the no. of segments required to form n digits of the kind $6 = 5n + 1$

No. of segments required to form 5 digit $= 5(5) + 1 = 26$

No. of segments required to form 10 digit $= 5(10) + 1 = 51$

No. of segments required to form 100 digit $= 5(100) + 1 = 501$

(b) It is given that the no. of segments required to form n digit of the kind 4 is $3n + 1$

No. of segments required to form 5 digit $= 3(5) + 1 = 16$

No. of segments required to form 10 digit $= 3(10) + 1 = 31$

No. of segments required to form 100 digit $= 3(100) + 1 = 301$

(c) It is given that the no. of segments required to form n digits of the kind $8 = 5n + 2$

No. of segments required to form 5 digit $= 5(5) + 2 = 27$

No. of segments required to form 10 digit $= 5(10) + 2 = 52$

No. of segments required to form 100 digit $= 5(100) + 2 = 502$

2. (i) $2n - 1 \rightarrow 100^{th} : 199$

(ii) $3n + 2 \rightarrow 5^{th} : 17$

$10^{th} : 32$

$100^{th} : 302$

(iii) $4n + 1 \rightarrow 5^{th} : 21$

$10^{th} : 41$

$100^{th} : 401$

(iv) $7n + 20 \rightarrow 5^{th} : 55$

$10^{th} : 90$

$100^{th} : 720$

(v) $n^2 + 1 \rightarrow 5^{th} : 26$

$10^{th} : 101$

SUBJECT ENRICHMENT EXERCISE

I. 1. – 5y 2. 15

3. Trinomial 4. 0

5. 0 6. 5

II. (a) False (b) False

(c) False (d) False

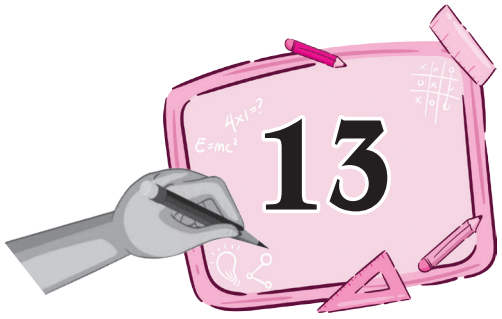
(e) False (f) False

(g) False (h) True

III. (1) 3x – 2 (2) 5

(3) $\frac{1}{2} \times p \times q = \frac{pq}{2}$ (4) Monomial

(5) $x^3 - y^3$



Power and Exponents

EXERCISE 13.1

1. (a) Base = 3, Exponent = 3
Expanded form = 3 × 3 × 3
Value = 27

(b) Base = 5, Exponent = 3, Expanded form = 5 × 5 × 5
Value = 125

(c) Base = 7, Exponent = 3, Expanded form = 7 × 7 × 7
Value = 343

(d) Base = 9, Exponent = 4, Expanded form = 9 × 9 × 9 × 9
Value = 6561

2. (a) $2^4 = 2 \times 2 \times 2 \times 2 = 16$

(b) $5^2 = 5 \times 5 = 25$

(c) $4^3 = 4 \times 4 \times 4 = 64$

(d) $13^2 = 13 \times 13 = 169$

(e) $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$

(f) $5^5 = 5 \times 5 \times 5 \times 5 \times 5 = 25 \times 25 \times 5 = 625 \times 5 = 3125$

(g) $7^4 = 7 \times 7 \times 7 \times 7 = 49 \times 49 = 2401$

(h) $3^4 = 3 \times 3 \times 3 \times 3 = 9 \times 9 = 81$

(i) $(-3)^4 = (-3) \times (-3) \times (-3) \times (-3) = 9 \times 9 = 81$

3. (a) $5^3 = 5 \times 5 \times 5 = 125$

(b) $(-2)^3 = (-2) \times (-2) \times (-2) = -8$

(c) $5^2 = 5 \times 5 = 25$

(d) $(-7)^2 = -7 \times -7 = 49$

(e) $(-6)^3 = -6 \times -6 \times -6 = -216$

(f) $7^4 = 7 \times 7 \times 7 \times 7 = 49 \times 49 = 2401$

4. (a) $\left(\frac{3}{2}\right)^2 = \frac{27}{8}$

(b) $\left(\frac{-3}{6}\right)^5 = \left(\frac{-\cancel{3}^{1}}{\cancel{6}_{2}}\right)^5 = \left(\frac{-1}{2}\right)^5 = \frac{-1}{32}$

(c) $\left(-\frac{7}{8}\right)^4 = \frac{49\times49}{64\times64} = \frac{2401}{4096}$

(d) $\left(\frac{5}{4}\right)^3 = \frac{5\times5\times5}{4\times4\times4} = \frac{125}{64}$

(e) $\left(-\frac{9}{7}\right)^3 = \frac{-9\times-9\times-9}{7\times7\times7} = \frac{-729}{343}$

(f) $\left(\frac{6}{5}\right)^4 = \frac{6\times6\times6\times6}{5\times5\times5\times5} = \frac{36\times36}{25\times25} = \frac{1296}{625}$

5. (a) $\frac{1}{125} = \frac{1\times1\times1}{5\times5\times5} = \frac{(1)^3}{(5)^3} = \left(\frac{1}{5}\right)^3$

(b) $\frac{1}{256} = \frac{1}{16\times16} = \frac{1}{4\times4\times4\times4} = \frac{1\times1\times1\times1\times1\times1\times1\times1}{2\times2\times2\times2\times2\times2\times2\times2} = \frac{(1)^8}{2^8} = \left(\frac{1}{2}\right)^8$

(c) $\frac{-27}{125} = \frac{-3\times-3\times-3}{5\times5\times5} = \left(\frac{-3}{5}\right)^3$

(d) $\frac{-1}{343} = \frac{-1\times-1\times-1}{7\times7\times7} = \left(\frac{-1}{7}\right)^3$

(e) $\frac{81}{144} = \frac{3\times3\times3\times3}{12\times12} = \frac{3\times3\times3\times3}{3\times4\times3\times4} = \frac{(9)^2}{(12)^2} = \left(\frac{9}{12}\right)^2$

6. (a) $324 = 2 \times 162 = 2 \times 2 \times 81 = 2 \times 2 \times 9 \times 9$
$= 2 \times 2 \times 3 \times 3 \times 3 \times 3 = 2^2 \times 3^4$

(b) $675 = 3 \times 225 = 3 \times 15 \times 15 = 3 \times 5 \times 3 \times 5 \times 3 = 3^3 \times 5^2$

(c) $4800 = 48 \times 100 = 6 \times 8 \times 10 \times 10 = 2 \times 3 \times 2 \times 2 \times 2 \times 5 \times 2 \times 5 \times 2 = 2^6 \times 3 \times 5^2$

(d) $2000 = 2 \times 1000 = 2 \times 10 \times 10 \times 10 = 2 \times 2 \times 5 \times 2 \times 5 \times 2 \times 5 = 2^4 \times 5^3$

(e) $1024 = 2 \times 512 = 2 \times 2 \times 256 = 2 \times 2 \times 16 \times 16$
$= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^{10}$

(f) $864 = 2 \times 432 = 2 \times 2 \times 216 = 2 \times 2 \times 2 \times 108$
$2 \times 2 \times 2 \times 2 \times 54 = 2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 3 = 2^5 \times 3^3$

7. (a) 2^3 or 5^2
$2^3 = 8$
$5^2 = 25$
Clearly, $5^2 > 2^3$

(b) $(-2)^5$ or 2^5
$(-2)^5 = -32$
$(2)^5 = 32$
Clearly, $2^5 > (-2)^5$

(c) 9^2 or 2^9
$9^2 = 81$
$2^9 = 512$
Clearly, $2^9 > 9^2$

8. (a) $(12)^2 \times 10^3$

$144 \times 1000 = 144000$

(b) $3 \times 5^3 = 3 \times 125 = 375$

(c) $8^2 + (-3)^3 = 64 - 27 = 37$

(d) $6^3 - 5^3 = 216 - 125 = 91$

(e) $(-2)^3 \times (-3)^3 \times (-1)^3 = -8 \times -27 \times -1 = -216$

(f) $\left(\frac{2}{3}\right)^3 = \frac{8}{27}$

(g) $(-5)^3 \times 10^2 = -125 \times 100 = -12500$

(h) $6^3 \times (-2)^5 \times (-4) = 216 \times (-32) \times (-4) = 27648$

EXERCISE 13.2

1. (a) $4^3 \times 4^4 = 4^{3+4} = 4^7$

(b) $5^2 \times 5^3 = 5^{2+3} = 5^5$

(c) $a^3 \times a^3 = a^{3+3} = a^6$

(d) $\left(\frac{3}{2}\right)^3 \times \left(\frac{3}{2}\right)^2 = \left(\frac{3}{2}\right)^{3+2} = \left(\frac{3}{2}\right)^5$

(e) $\left(\frac{-2}{5}\right)^2 \times \left(\frac{-2}{5}\right)^3 = \left(\frac{-2}{5}\right)^{2+3} = \left(\frac{-2}{5}\right)^5$

(f) $2^3 \times 2^4 = 2^{3+4} = 2^7$

(g) $p^3 \times p \times p^5 = p^{3+1+5} = p^9$

(h) $a^m \times a^3 = a^{3+m}$

(i) $(-3)^5 \times (-3)^2 = (-3)^{5+2} = (-3)^7$

(j) $(-3)^5 \div (-3)^3 = (-3)^{5-3} = (-3)^2$

2. (a) $(3^3)^2 = 3^{3\times2} = 3^6 = 729$

(b) $(5^3)^2 = 5^{3\times2} = 5^6 = 15625$

(c) $(7^2)^3 = 7^{2\times3} = 7^6 = 117649$

(d) $(9^2)^2 = 9^{2\times2} = 9^4 = 6561$

3. (a) $(x^a)^b = x^{a\times b} = x^{ab}$

(b) $(x^3)^a = x^{3a}$

(c) $(x^a)^5 = x^{5\times a} = x^{5a}$

(d) $(x^3)^3 = a^{3\times3} = a^9$

(e) $(a^2)^4 = a^{2\times4} = a^8$

(f) $(b^x)^y = b^{xy} = b^{xy}$

(g) $(a^x)^2 = a^{x\times2} = a^{2x}$

(h) $(3^x)^y = 3^{xy}$

4. (a) $(2 \times 4)^2 = (8)^2 = 64$

(b) $(3 \times 3)^2 = 3^2 \times 3^2 = 9 \times 9 = 81$

(c) $(7 \times 2)^3 = 7^3 \times 2^3 = 343 \times 8 = 2744$

(d) $(5 \times 4)^2 = 5^2 \times 4^2 = 25 \times 16 = 400$

(e) $(a \times b)^2 = (ab)^2 = a^2b^2$

(f) $(x \times y)^a = x^a \times y^a = x^a y^a$

(g) $(a \times b)^n = a^n \times b^n = a^n b^n$

(h) $(a \times b)^5 = a^5 \times b^5 = a^5 b^5$

5. (a) $x^2y^2 = (xy)^2$

(b) $x^a \times x^a = x^{a+a} = x^{2a}$

(c) $5^3 \times 7^3 = (5 \times 7)^3 = 35^3$

(d) $8^7 \times 8^9 = 8^{7+9} = 8^{16}$

(e) $3^3 \times a^3 = (3 \times a)^3 = (3a)^3$

(f) $5^x \cdot 6^x = (5 \times 6)^x = 30^x$

(g) $3^a \times 5^a = (3 \times 5)^a = 15^a$

(h) $5^3 \times 5^5 = 5^{3+5} = 5^8$

6. (a) $4^0 = 1$

(b) $a^x \div a^x = a^{x-x} = a^0 = 1$

(c) $7^0 = 1$

(d) $4^0 \times 3^2 = 1 \times 3^2 = 3^2$

(e) $4^0 \times 5^0 = 1 \times 1 = 1$

(f) $x^0 = 1$

(g) $x^0 \cdot y^0 = 1 \times 1 = 1$

(h) $p^0 \cdot q^0 = 1 \times 1 = 1$

7. (a) $\frac{1}{2^3} = 2^{-3}$

(b) $\frac{1}{4^3} = 4^{-3}$

(c) $\frac{4^5}{4^8} = 4^{5-8} = 4^{-3}$

(d) $\frac{a^3 \times a^2}{a^7} = \frac{a^{3+2}}{a^7} = \frac{a^5}{a^7} = a^{5-7} = a^{-2}$

(e) $\frac{a^{-2}}{a^4} = a^{-2} \div a^4 = a^{-2-4} = a^{-6}$

(f) $\frac{1}{a} = a^{-1}$

(g) $\frac{1}{16} = \frac{1}{4^2} = \frac{1}{2^4} = 2^{-4}$

(h) $a^2 \div a^5 = a^{2-5} = a^{-3}$

8. (a) $\frac{(2^4)^2 \times 5^3}{8^2 \times 5} = \frac{2^8 \times 5^3}{(2^3)^2 \times 5} = \frac{2^8 \times 5^3}{2^6 \times 5}$

$= 2^8 \div 2^6 \times 5^3 \div 5^1$

$= 2^{8-6} \times 5^{3-1}$

$= 2^2 \times 5^2 = (2 \times 5)^2 = 10^2 = 100$

(b) $\frac{5^3 \times 3^5 \times 6}{3^2 \times 25} = \frac{5^3 \times 3^5 \times 2 \times 3}{3^2 \times 5 \times 5}$

$= \frac{5^3 \times 3^{5+1} \times 2}{3^2 \times 5^2} = \frac{5^3 \times 3^6 \times 2}{3^2 \times 5^2}$

$= 5^{3-2} \times 3^{6-2} \times 2 = 5 \times 3^4 \times 2$

$= 10 \times 3^4 = 810$

(c) $[(5^2)^3 \times 5^4] \div 5^3$

$[5^6 \times 5^4] \div 5^3 = 5^{6+4} \div 5^3$

$= 5^{10} \div 5^3 = 5^{10-3} = 5^7 = 78125$

EXERCISE 13.3

1. (a) $642000000 = 6.42 \times 10^8$

(b) $359710000 = 3.5971 \times 10^8$

(c) $10000000000 = 1 \times 10^{10}$

(d) $458 = 4.58 \times 10^2$

(e) $1000 = 1.0 \times 10^3$

(f) $74582 = 7.4582 \times 10^4$

(g) $852147 = 8.52147 \times 10^5$

(h) $95147823600000 = 9.51478236 \times 10^{13}$

2. (a) $6.023 \times 10^{11} = 602300000000$

(b) $7.0004 \times 10^7 = 70004000$

(c) $3.2 \times 10^4 = 32000$

(d) $3.14071 \times 10^4 = 31407.1$

3. (a) $870123.68 = 8.7012368 \times 10^5$

(b) $444 \times 10^8 = 4.44 \times 10^{10}$

(c) 40 billion $= 40000000000 = 4 \times 10^{10}$

(d) 6 crore $= 60000000 = 6 \times 10^7$

4. (a) 1.05×10^6 kg

(b) 4.8×10^5 km

(c) 2×10^{11} stars

NCERT CORNER

EXERCISE 13.1

1. (i) $2^6 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 64$

(ii) $9^3 = 9 \times 9 \times 9 = 729$

(iii) $11^2 = 11 \times 11 = 121$

(iv) $5^4 = 5 \times 5 \times 5 \times 5 = 625$

2. (i) 6^4 (ii) t^2

(iii) b^4 (iv) $5^2 \times 7^3$

(v) $2^2 \times a^2$ (vi) $a^3 \times c^4 \times d$

3. (i) $512 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 2^9$

(ii) $343 = 7 \times 7 \times 7 = 7^3$

(iii) $729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 3^6$

(iv) $3125 = 5 \times 5 \times 5 \times 5 \times 5 = 5^5$

4. (i) 4^3 or 3^4

$4^3 = 4 \times 4 \times 4 = 64$

$3^4 = 3 \times 3 \times 3 \times 3 = 81$

$\therefore 3^4 > 4^3$

(ii) 5^3 or 3^5

$5^3 = 5 \times 5 \times 5 = 125$

$3^5 = 3 \times 3 \times 3 \times 3 \times 3 = 243$

$\therefore 3^5 > 5^3$

(iii) 2^8 or 8^2

$2^8 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 256$

$8^2 = 8 \times 8 = 64$

$\therefore 2^8 > 8^2$

(iv) 100^2 or 2^{100}

$100^2 = 100 \times 100 = 10000$

$2^{100} = (2^{10})^{10} = (1024)^{10}$

$\therefore 2^{100} > 100^2$

(v) 2^{10} or 10^2

$2^{10} = 1024$

$10^2 = 100$

$\therefore 2^{10} > 10^2$

5. (i) $648 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 = 2^3 \times 3^4$

(ii) $405 = 5 \times 3 \times 3 \times 3 \times 3 = 5 \times 3^4$

(iii) $540 = 2 \times 2 \times 3 \times 3 \times 3 \times 5 = 2^2 \times 3^3 \times 5$

(iv) $3600 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5 = 2^4 \times 3^2 \times 5^2$

6. (i) $2 \times 10^3 = 2 \times 1000 = 2000$

(ii) $7^2 \times 2^2 = (7 \times 2)^2 = (14)^2 = 196$

(iii) $2^3 \times 5 = 8 \times 5 = 40$

(iv) $3 \times 4^4 = 3 \times 256 = 768$

(v) $0 \times 10^2 = 0 \times 100 = 0$

(vi) $5^2 \times 3^3 = 25 \times 27 = 675$

(vii) $2^4 \times 3^2 = 16 \times 9 = 144$

(viii) $3^2 \times 10^4 = 9 \times 10000 = 90000$

7. (i) $(-4)3 = -4 \times -4 \times -4 = -64$

(ii) $(-3) \times (-2)^3 = (-3) \times (-2) \times (-2) \times (-2) = 24$

(iii) $(-3)^2 \times (-5)^2 = (-3)\,(-3) \times (-5)\,(-5) = 9 \times 25 = 225$

(iv) $(-2)^3 \times (-10)^3 = (-2)\,(-2)\,(-2) \times (-10)\,(-10)\,(-10) = -8 \times -1000 = 8000$

8. (i) 2.7×10^{12} ; 1.5×10^8

$2.8 \times 10^{12} > 1.5 \times 10^8$

(ii) 4×10^{14} ; 3×10^{17}

$3 \times 10^{17} > 4 \times 10^{14}$

EXERCISE 13.2

1. (i) $3^2 \times 3^4 \times 3^8 = 3^{2+4+8} = 3^{14}$

(ii) $6^{15} \div 6^{10} = 6^{15-10} = 6^5$

(iii) $a^3 \times a^2 = a^{3+2} = a^5$

(iv) $7^x \times 7^2 = 7^{x+2} = 7^{x+2}$

(v) $(5^2)^3 \div 5^3 = 5^{2\times 3} \div 5^3 = 5^6 \div 5^3 = 5^{6-3} = 5^3$

(vi) $2^5 \times 5^5 = (2 \times 5)^5 = 10^5$

(vii) $a^4 \times b^4 = (a \times b)^4 = (ab)^4$

(viii) $(3^4)^3 = 3^{4\times 3} = 3^{12}$

(ix) $(2^{20} \div 2^{15}) \times 2^3 = 2^{20-15} \times 2^3 = 2^5 \times 2^3 = 2^{5+3} = 2^8$

(x) $8^t \div 8^2 = 8^{t-2}$

2. (i) $\dfrac{2^3 \times 3^4 \times 4}{3 \times 32} = \dfrac{2^3 \times 3^4 \times 2^2}{3 \times 2^5} = \dfrac{2^{3+2} \times 3^4}{3 \times 2^5}$

$= \dfrac{2^5 \times 3^4}{3 \times 2^5} = 2^{5-5} \times 3^{4-1} = 2^0 \times 3^3 = 1 \times 3^3 = 3^3$

(ii) $[(5^2)^3 \times 5^4] \div 5^7 = [5^{2\times 3} \times 5^4] \div 5^7$

$= 5^{6+4} \div 5^7 = 5^{10} \div 5^7 = 5^{10-7} = 5^3$

(iii) $25^4 \div 5^3 = (5^2)^4 \div 5^3 = 5^8 \div 5^3 = 5^{8-3} = 5^5$

(iv) $\dfrac{3 \times 7^2 \times 11^8}{21 \times 11^3} = \dfrac{3 \times 7^2 \times 11^8}{7 \times 3 \times 11^3} = 3^{1-1} \times 7^{2-1} \times 11^{8-3}$

$= 3^0 \times 7^1 \times 11^5 = 1 \times 7 \times 11^5 = 7 \times 11^5$

(v) $\dfrac{3^7}{3^4 \times 3^3} = \dfrac{3^7}{3^{4+3}} = \dfrac{3^7}{3^7} = 3^{7-7} = 3^0 = 1$

(vi) $2^0 + 3^0 + 4^0 = 1 + 1 + 1 = 3$

(vii) $2^0 \times 3^0 \times 4^0 = 1 \times 1 \times 1 = 1$

(viii) $(3^0 + 2^0) \times 5^0 = (1 + 1) \times 1 = 2 \times 1 = 2$

(ix) $\dfrac{2^8 \times a^5}{4^3 \times a^3} = \dfrac{2^8 \times a^5}{(2^2)^3 \times a^3} = \dfrac{2^8 \times a^5}{2^6 \times a^3}$

$= 2^{8-6} \times a^{5-3} = 2^2 \times a^2 = (2a)^2$

(x) $\left(\dfrac{a^5}{a^3}\right) \times a^8 = a^{5-3} \times a^8 = a^2 \times a^8 = a^{2+8} = a^{10}$

(xi) $\dfrac{4^5 \times a^8 b^3}{4^5 \times a^5 b^2} = 4^{5-5} \times a^{8-5} \times b^{3-2}$

$= 4^0 \times a^3 \times b^1 = 1 \times a^3 \times b = a^3 b$

(xii) $(2^3 \times 2)^2 = (2^{3+1})^2 = 2^{4\times 2} = 2^8$

3. (i) $10 \times 10^{11} = 100^{11}$

$10^{11+1} = 100^{12}$

$10^{12} \neq 100^{12}$

LHS $\neq$ RHS

$\therefore$ The given statement is false

(ii) $2^3 > 5^2$

$2^3 = 8$

$5^2 = 25$

As $25 > 8$

$\therefore$ this given statement is false

(iii) $2^3 \times 3^2 = 6^5$

$8 \times 9 = 7776$

$72 \neq 7776$

LHS $\neq$ RHS

$\therefore$ The given statement is false

(iv) $3^0 = (1000)^0$

$1 = 1$

LHS = RHS

$\therefore$ the given statement is true

4. (i) 108×192

$(2 \times 2 \times 3 \times 3 \times 3) \times (2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3)$

$2^8 \times 3^4$

(ii) $270 = 2 \times 3 \times 3 \times 5 = 2 \times 3^3 \times 5$

(iii) $729 \times 64 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 3^6 \times 2^6$

(iv) $768 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 3 = 2^8 \times 3$

5. (i) $\dfrac{(2^5)^2 \times 7^3}{8^3 \times 7} = \dfrac{2^{10} \times 7^3}{(2^3)^3 \times 7} = \dfrac{2^{10} \times 7^3}{2^9 \times 7}$

$= 2^{10-9} \times 7^{3-1} = 2^1 \times 7^2 = 2 \times 49 = 98$

(ii) $\dfrac{25 \times 5^2 \times t^8}{10^3 \times t^4} = \dfrac{5^2 \times 5^2 \times t^8}{10^3 \times t^4} = \dfrac{5^4 \times t^{8-4}}{5^3 \times 2^3}$

$\dfrac{5^{4-3} \times t^4}{8} = \dfrac{5t^4}{8}$

(iii) $\dfrac{3^5 \times 10^5 \times 25}{5^7 \times 6^5} = \dfrac{3^5 \times (2 \times 5)^5 \times 5^2}{5^7 \times 6^5}$

$\dfrac{3^5 \times 2^5 \times 5^5 \times 5^2}{5^7 \times 2^5 \times 3^5}$

$\dfrac{3^5 \times 2^5 \times 5^{5+2}}{5^7 \times 2^5 \times 3^5} = 3^{5-5} \times 2^{5-5} \times 5^{7-7}$

$= 3^0 \times 2^0 \times 5^0 = 1 \times 1 \times 1 = 1$

EXERCISE 13.3

1. $279404 = 2 \times 10^5 + 7 \times 10^4 + 9 \times 10^3 + 4 \times 10^2 + 0 \times 10^1 + 4 \times 10^0$

$3006194 = 3 \times 10^6 + 0 \times 10^5 + 0 \times 10^4 + 6 \times 10^3 + 1 \times 10^2 + 9 \times 10^1 + 4 \times 10^0$

$2806196 = 2 \times 10^6 + 8 \times 10^5 + 0 \times 10^4 + 6 \times 10^3 + 1 \times 10^2 + 9 \times 10^1 + 6 \times 10^0$

$120719 = 1 \times 10^5 + 2 \times 10^4 + 0 \times 10^3 + 7 \times 10^2 + 1 \times 10^1 + 9 \times 10^0$

$20068 = 2 \times 10^4 + 0 \times 10^3 + 0 \times 10^2 + 6 \times 10^1 + 8 \times 10^0$

2. (a) 86045 (b) 405302

(c) 30705 (d) 900230

3. (i) 5×10^7 (ii) 7×10^6

(iii) 3.1865×10^9 (iv) 3.90878×10^5

(v) 3.90878×10^4 (vi) 3.90878×10^3

4. (a) 3.84×10^8 m (b) 3×10^8 m/s

(c) 1.2756×10^7 m (d) 1.4×10^9 m

(e) 1×10^{11} stars (f) 1.2×10^{10} year

(g) 3×10^{20} m (h) 6.023×10^{22}

(i) 1.353×10^9 cubic km (j) 1.027×10^9

SUBJECT ENRICHMENT EXERCISE

I. (1) Exponent (2) 0

(3) $\left(\frac{-1}{7}\right)^4$ (4) $\left(\frac{3}{2}\right)^5$

(5) $(-6)^1$

II. (1) 100 (2) 3.7×10^1

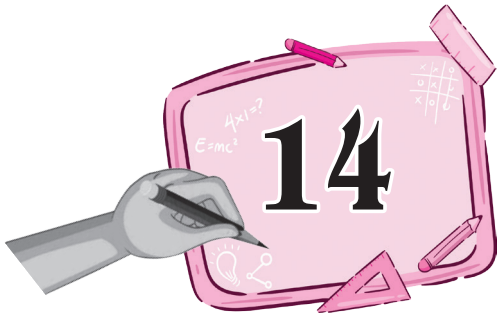
(3) $\frac{-1}{4}$ (4) -45

(5) $\frac{3}{a^2}$

III. (1) False (2) False

(3) True (4) True

(5) False

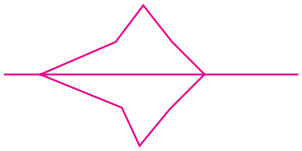


Symmetry

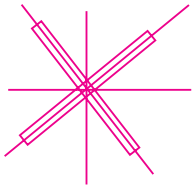
EXERCISE 14.1

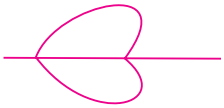
1. Reflection symmetry (b), (c), (d), (e), (f)

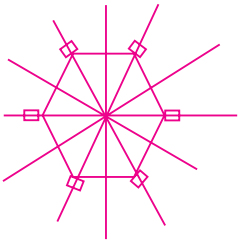
(b) 

(c) 

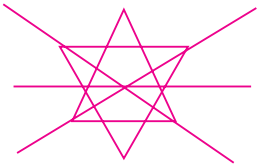
(d) 

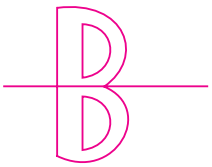
(e) 

(f) 

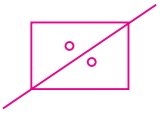
2. (a) 

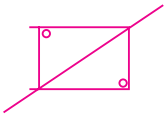
(b) 

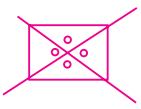
(c) 

(d) 

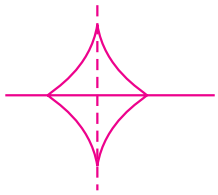
3. The axes of symmetry in the given fig. are as followed

(a) 

(b) 

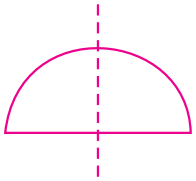
(c) 

(d) 

4. (a) 

Same as do it yourself on squared paper.

5. (a) a semicircle has only one line of symmetry



(b) A regular octagon has 8 lines of symmetry

6. Horizontal mirror – O, B

Vertical mirror – T, O, M, A

B, O, will look the same after reflection in horizontal mirror.

EXERCISE 14.2

1. N has rotational sysmmetry of order 2

H has rotational symmetry of order 2

Z has rotational symmetry of order 2

O has rotational sysmmetry

2. (a) Order 3

(b) Order O because it reflection

(c) Order 2

(d) Order 2

(e) Order 1

(f) Order 2

EXERCISE 14.3

1. Do it self

2. (d) has rotational symmetry of order more than 2

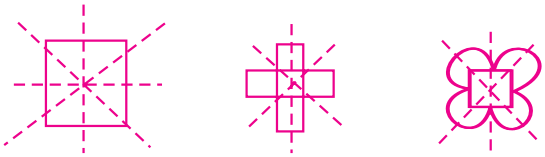
3. (a) Order 2 (b) Order 1

(c) Order 8

4.

	Line of symmetry	rotational symmetry
(a)	1	1
(b)	5	5
(c)	1	1
(d)	6	6

5. Do it yourself

6. 

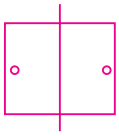
7. Option (c), (d), (e), (f), (h)

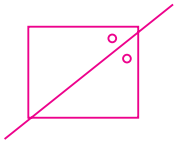
8. It can be observed that if the angle of rotation of a fig is a factor of 360°, then it will have a rotation symmetry of order more than 1

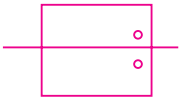
It can be checked that 90° is a factor of 360° but 43° is not. Therefore the fig having its angle of rotation as 90° will have its rotational symmetry of order more than 1. However, the fig. having its angle of rotation 43 will not be having its rotational symmetry of order more than 1.

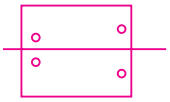
9. square has both line and rotational symmetry of order more than 2 i.e. it has a line symmetry of 4 and rotational symmetry of order 4.

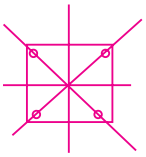
NCERT CORNER

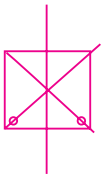
1. (a) 

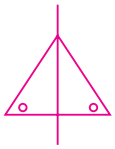
(b) 

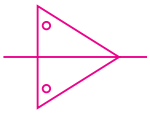
(c) 

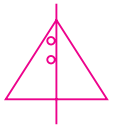
(d) 

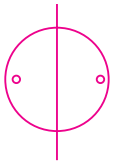
(e) 

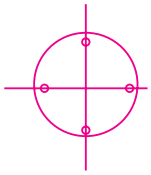
(f) 

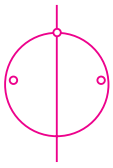
(g) 

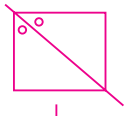
(h) 

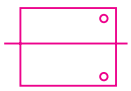
(i) 

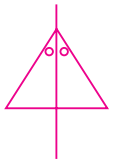
(j) 

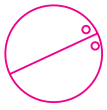
(k) 

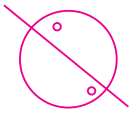
(l) 

2. (a) 

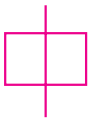
(b) 

(c) 

(d) 

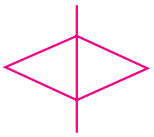
(e) 

3. (a) It will be a square

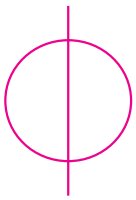


(b) It will be triangle

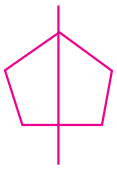
(c) It will be a rhombus



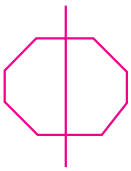
(d) It will be a circle



(e) It will be a pentagon

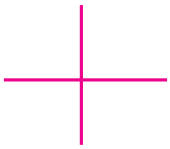


(f) It will be an octagon

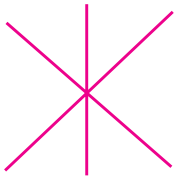


4. (a) The given fig. has 3 lines of symmetry. hence, it has multiple lines of symmetry.

(b) The given fig. has 2 lines of symmetry. Hence, it has multiple lines of symmetry.

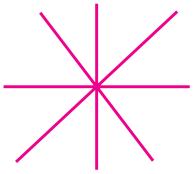


(c) The given fig. has 3 lines of symmetry. Hence, it has multiple lines of symmetry.



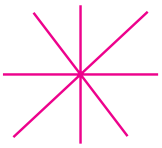
(d) The given fig. has 2 lines of symmetry. Hence, it has multiple line of symmetry.

(e) The given fig. has 4 lines of symmetry. hence, it has multiple lines

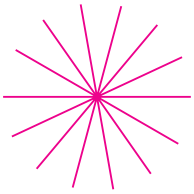


(f) The given fig. has only 1 line of symmetry.

(g) The given fig. has 4 lines of symmetry. Hence, it has multiple of line of symmetry



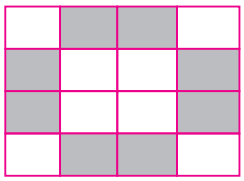
(h) The given fig. has 6 lines of symmetry . Hence it has multiple line of symmetry.



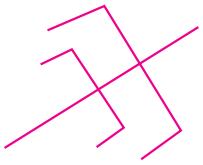
5. We can shade a few more squares so as to make the given fig. symmetry about any of its diagonals

Yes, the fig. is symmetry about both the diagonals.

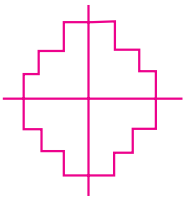
There is more than one way so its to make the fig. symmetric about a diagonal as we can choose any of its 2 diagonals.



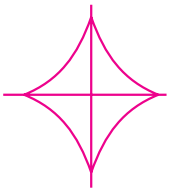
6. (a)



(b)



(c)



7. (a) There are 3 lines of symmetry in an equilateral triangle

(b) There is only 1 line of symmetry in an isosceles triangles

(c) There is no line of symmetry in a scalene triangle

(d) There are 4 lines of symmetry in a square

(e) There are 2 lines of symmetry in a rectangle

(f) There are 2 lines of symmetry in a rhombus

(g) There is no line symmetry in a parallelogram

(h) There is no line of symmetry in a quadrilateral

(i) there are 6 lines of symmetry in a regular hexagon

(j) There are infinite lines of symmetry in a circle.

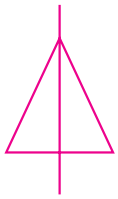
8. (a) A,H,I,M,O,T,U,V,W,X,Y, are the letters having a reflectional symmetry about a vertical mirror.

(b) B,C,D,E,H,I,K,O,X are the letter having a reflectional symmetry about a horizonatal mirror.

(c) H,I,O,X are the letter having a reflectional symmetry about both the vertical mirror and the horizontal mirror.

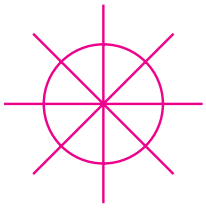
9. A scalene triangle, a parallelogram, and a trapezium do not have any line of symmetry

10. (a) An isosceles triangle has only 1 line of symmetry



$\therefore$ this line of symmetry is the median and also the altitute of this isosceles triangles

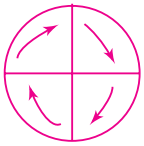
(b) There are infinite lines of symmetry in a circle.



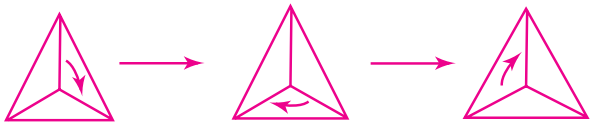
It can be concluded that each line of symmetry is the diameter for this circle.

EXERCISE 14.2

1. (a) The given fig. has its rotational symmetry as 4

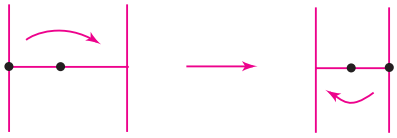


(b) the given fig. has its rotational symmetry as 3



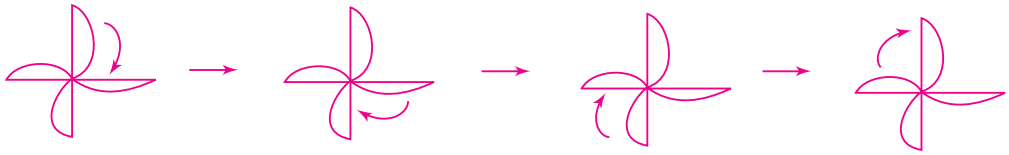
(c) The given fig. has its rotational symmetry as 1

(d) The given fig. has its rotational symmetry as 2



(e) The given fig. has its rotational symmetry as 3

(f) The given fig. its rotational symmetry as 4



Hence, fig. (a), (b), (d), (e), and (f) have rotational symmetry of order more than 1.

2. (a) 2 (b) 2

(c) 3 (d) 4

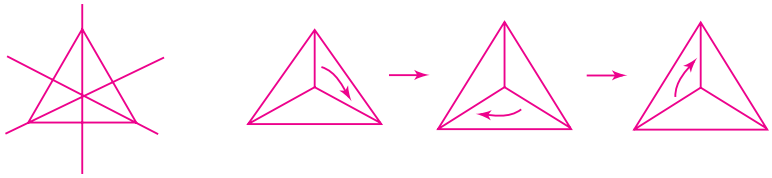
(e) 4 (f) 5

(g) 6 (h) 3

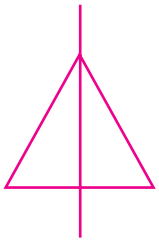
EXERCISE 14.3

1. Equilateral triangle and regular hexagon have both line of symmetry and rotational symmetry

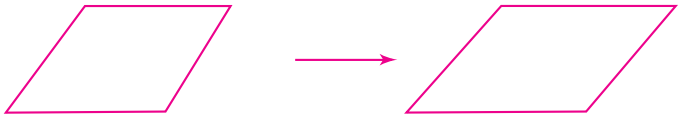
2. (i) equilateral traingel has 3 lines of symmetry and rotational symmetry of order 3.



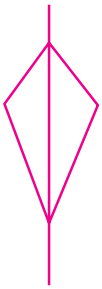
(ii) Isosceles traingle has only 1 line of symmetry and no rotational symmetry of order more than 1.



(iii) A parallelogram is a quadrilateral which has no line of symmetry but a rotational symmetry of order 2



(iv) A kite is a quadrilateral which has only 1 line of symmetry and no rotational symmetry of order more than 1



3. Yes, If a fig. has two or more lines of symmetry, then it will definitely have its rotational symmetry of order more than 1.

4.

Shape	Cetre of Rotation	Order of Rotation	Angle of Rotation
Square	Intersection point of diagonal	4	90°
Rectangle	Intersection point of diagonal	2	180°
Rhombus	Intersection point of diagonal	2	180°
Equilateral triangle	Intersection point of medians	3	120°
Regular Hexagon	Intersection point of diagonals	6	60°
Circle	Centre	Infinite	Any Angle
Semi-Circle	Centre	1	360°

5. Square, rectangle, and rhombus are the quadrilateral which have both line and rotational symmetry of order more than 1. A square has 4 lines of symmetry and rotational symmetry of order 4. A rectangle has 2 line of symmetry and rotational symmetry of order 2. A rhombus has 2 line of symmetry and rotaional symmetry of order 2.

6. It can be observed that if a fig. Books symmetrical on rotating by 60°, then it will also look symmetrical on rotating by 120°, 180°, 240°, 300° and 360° i.e. further mulitiples of 60°

7. It can be observed that if the angle of rotation of a fig. is a factor of 360°, then it will have a rotational symmetry of order more than 1.

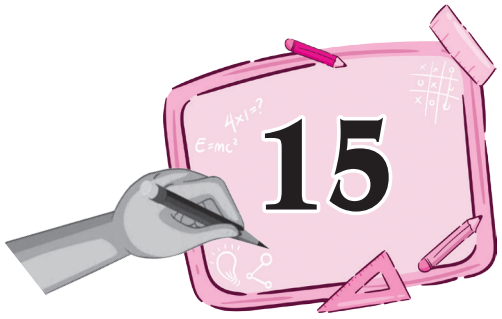
It can be checked that 45° is a factor of 360° but 17° is not. Therefore, the fig. having its angle of rotation as 45° will have its rotational symmetry of order more than 1, the fig. having its angle of rotation as 17° will not having its rotational symmetry of order more than 1.

SUBJECT ENRICHMENT EXERCISE

I. (1) Line of symmetry (2) 4
(3) 2 (4) 6

II. (a) One (b) One line of symmetry
(c) Infinite (d) Square
(e) 2

III. (1) False (2) True
(3) False (3) False



Visualising 3-D Shapes

EXERCISE 15.1

1. (a) This net can not be used to form a cube
(b) This net can be used to form a cube
(c) this net can be used to form a cube

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

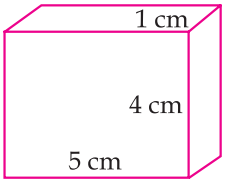
3. (a) Solid, vertex
(b) 8, 6
(c) Curved, circular
(d) edges
(e) 6, 8
(f) 3, 2
(g) equilateral
(h) Tetrahedron
(i) triangular

4. All figures of nets have 6 faces, 8 vertcices 12 edges

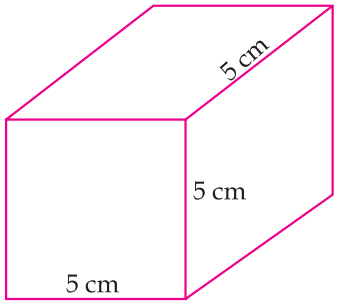
5. This fig. is a net of tetrahedron

EXERCISE 15.2

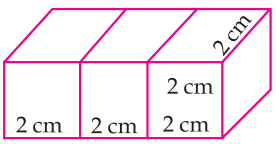
1.



2.

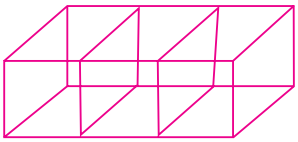


3.



Isometric sketch

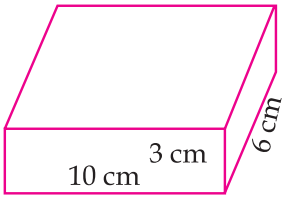
Dimension of cube = 6 cm × 2 cm × 2 cm



Oblique Sketch

4. Draw it yourself same as Q.3 but with single cube

5.



6. Draw it yourself.

7. Fig. (i) is represents the oblique sketch of the given isometric sketch.

8. Fig. (i) is represents the isometric sketch of the given oblique sketch.

EXERCISE 15.3

1.

	Vertical	**Horizonatal**
(i)		
(ii)		
(iii)		
(iv)		
(v)		

2. Do it yourself like

NCERT CORNER

EXERCISE 15.1

1. (a) when the faces that are folded to make a cube they will be overlapping each other

(b) A cube can thus be formed in the above way

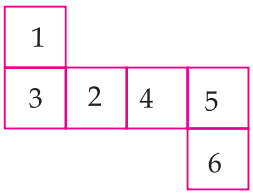
(c) A cube can thus be formed in the above way

(d) A cube can thus be formed in the above way

(e) When the faces that are folded to make a cube they will be overlapping each other

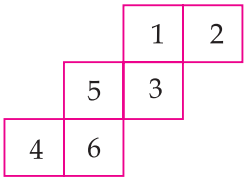
(f) A cube can thus be formed in the above way

2. (i) The no. can be inserted as follow so as to make the given net into a net of a dice.



It ca be observed that the sum of the opposite faces is 7

(ii) The no. can be inserted as follows so as to make the given net into a net of a dice

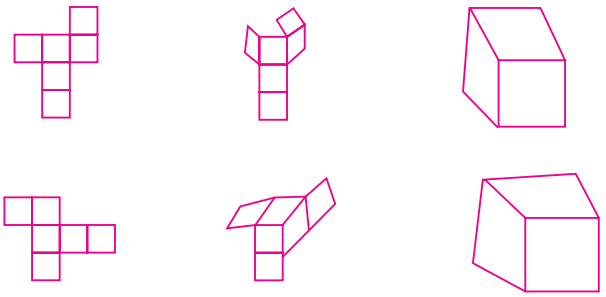


It ca be observed that the sum of the opposite faces is 7.

3. This can not be a net for a die.

It can be observed that the opposite faces of dice so formed have 2 and 5, 1 and 4, 3 and 6 on them. The sum of the no's on the opposite faces comes 7, 5, 9 respectively. However, in case of a dice, the sum of the number on the opposite faces should by 7. Hence this net is not of a dice.

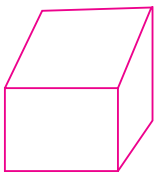
4. There are 3 faces in the given net. The given net can be completed as follow

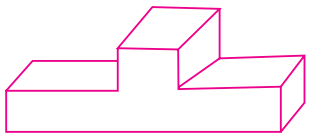


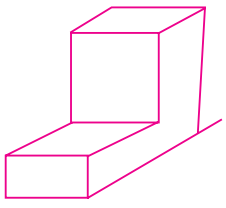
5. (a) – (ii) (c) – (iv)

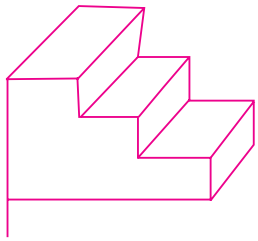
(b) – (iii) (d) – (i)

EXERCISE 15.2

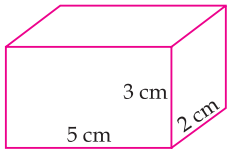
1. (i) 

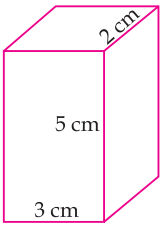
(ii) 

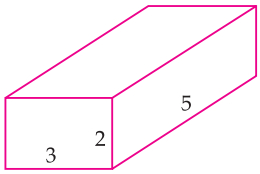
(iii) 

(iv) 

2.

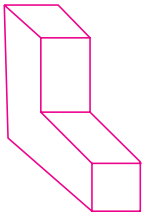


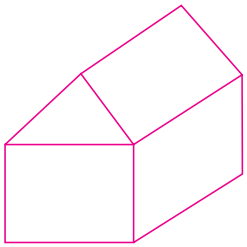




3. Do it yourself

4.

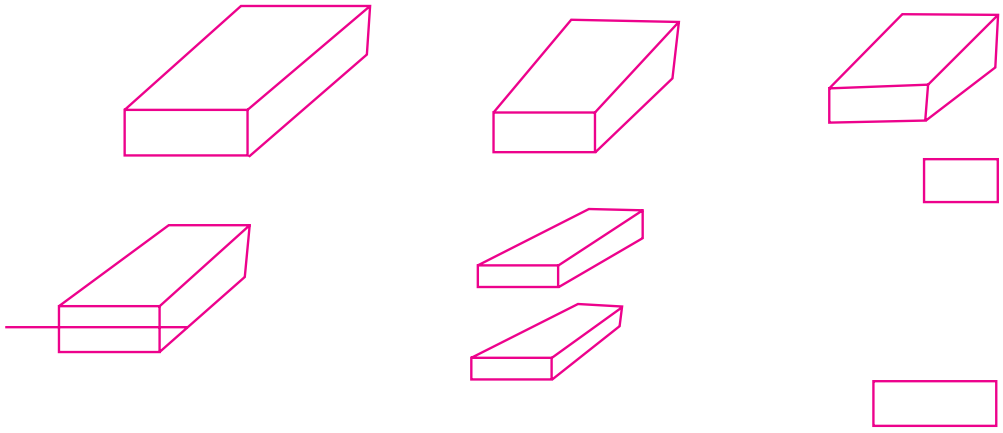




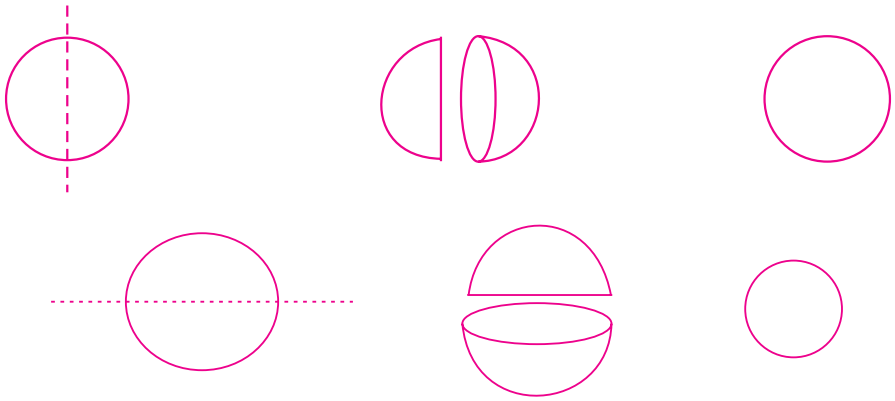
5. Do it yourself

EXERCISE 15.3

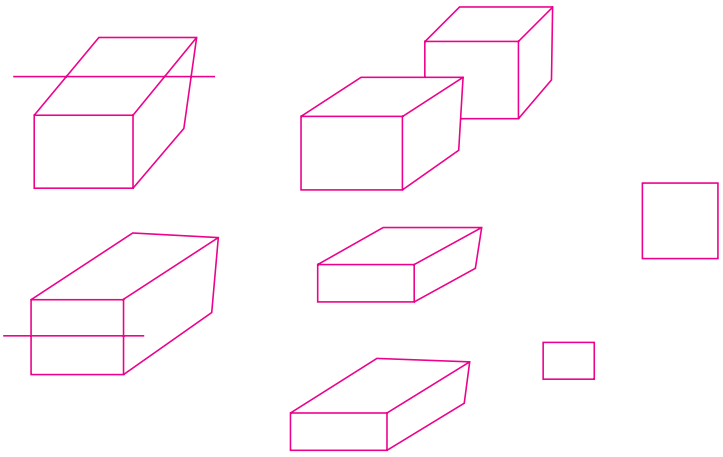
1. (a) A brick



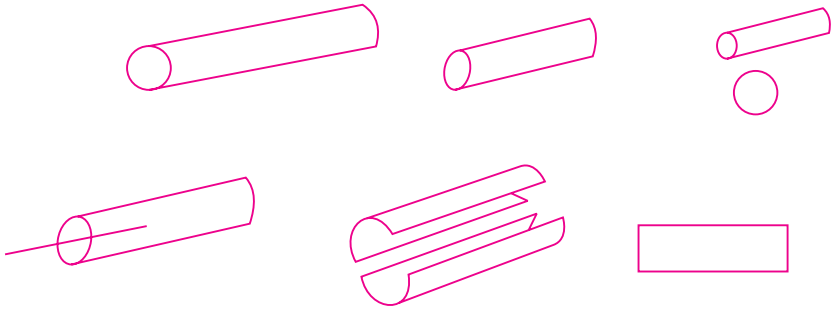
(b) A round apple



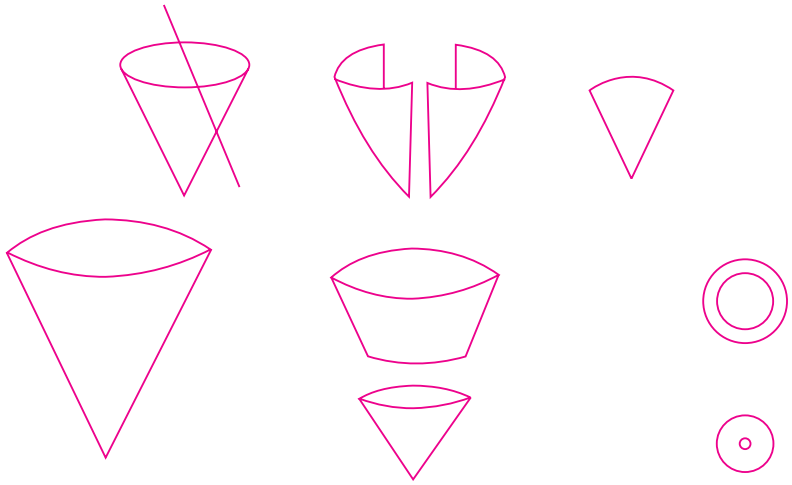
(c) A die



(d) A Circular park



(e) A ice cream cone

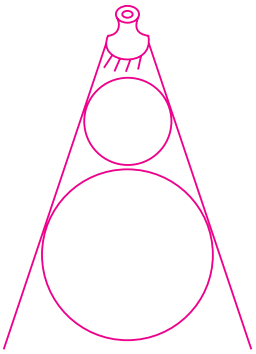


EXERCISE 15.4

1. (i) A ball

The shape of shadow of a ball will be a circle

(ii) The shape of shadow of a circular pipe will be a rectangle



(iii) The shape of shadow of a book will be a rectangle.

2. the given shadow can be obtained in case of the following objects

(i) Compact disk (ii) A dice

(iii) Triangular Pyramid (iv) Note Book

3. a cube can cast shadow only in the shape of a square. Therefore, any othere shapes are not possible.

SUBJECT ENRICHMENT EXERCISE

I. 1. Cone 2. Square

3. 10, 16, 24 4. 32

5. Cuboid

II. (1) Square (2)

(3) Curved, Flat (4) Tetrahedran

(5) Circle

III. (a) True (b) False

(c) False (d) False

(e) True (f) False