

ANSWERS

EXERCISE 1.1

- (i) 1 is the multiplicative identity (ii) Commutativity
(iii) Multiplicative inverse
- Associativity
- Rational number

EXERCISE 2.1

- $x = 18$
- $t = -1$
- $x = -2$
- $z = \frac{3}{2}$
- $x = 5$
- $x = 0$
- $x = 40$
- $x = 10$
- $y = \frac{7}{3}$
- $m = \frac{4}{5}$

EXERCISE 2.2

- $x = \frac{27}{10}$
- $n = 36$
- $x = -5$
- $x = 8$
- $t = 2$
- $m = \frac{7}{5}$
- $t = -2$
- $y = \frac{2}{3}$
- $z = 2$
- $f = 0.6$

EXERCISE 3.1

- (a) 1, 2, 5, 6, 7 (b) 1, 2, 5, 6, 7 (c) 1, 2
(d) 2 (e) 1
- A polygon with equal sides and equal angles.
(i) Equilateral triangle (ii) Square (iii) Regular hexagon

EXERCISE 3.2

- (a) $360^\circ - 250^\circ = 110^\circ$ (b) $360^\circ - 310^\circ = 50^\circ$
- (i) $\frac{360^\circ}{9} = 40^\circ$ (ii) $\frac{360^\circ}{15} = 24^\circ$
- $\frac{360}{24} = 15$ (sides) 4. Number of sides = 24



5. (a) No; (Since 22 is not a divisor of 360)
 (b) No; (because each exterior angle is $180^\circ - 22^\circ = 158^\circ$, which is not a divisor of 360°).
 6. (a) The equilateral triangle being a regular polygon of 3 sides has the least measure of an interior angle $= 60^\circ$.
 (b) By (a), we can see that the greatest exterior angle is 120° .

EXERCISE 3.3

1. (i) BC (Opposite sides are equal) (ii) $\angle DAB$ (Opposite angles are equal)
 (iii) OA (Diagonals bisect each other)
 (iv) 180° (Interior opposite angles, since $\overline{AB} \parallel \overline{DC}$)
2. (i) $x = 80^\circ; y = 100^\circ; z = 80^\circ$ (ii) $x = 130^\circ; y = 130^\circ; z = 130^\circ$
 (iii) $x = 90^\circ; y = 60^\circ; z = 60^\circ$ (iv) $x = 100^\circ; y = 80^\circ; z = 80^\circ$
 (v) $y = 112^\circ; x = 28^\circ; z = 28^\circ$
3. (i) Can be, but need not be.
 (ii) No; (in a parallelogram, opposite sides are equal; but here, $AD \neq BC$).
 (iii) No; (in a parallelogram, opposite angles are equal; but here, $\angle A \neq \angle C$).
4. A kite, for example 5. $108^\circ; 72^\circ$; 6. Each is a right angle.
7. $x = 110^\circ; y = 40^\circ; z = 30^\circ$
8. (i) $x = 6; y = 9$ (ii) $x = 3; y = 13$; 9. $x = 50^\circ$
10. $\overline{NM} \parallel \overline{KL}$ (sum of interior opposite angles is 180°). So, KLMN is a trapezium.
11. 60° 12. $\angle P = 50^\circ; \angle S = 90^\circ$

EXERCISE 3.4

1. (b), (c), (f), (g), (h) are true; others are false.
2. (a) Rhombus; square. (b) Square; rectangle
3. (i) A square is 4-sided; so it is a quadrilateral.
 (ii) A square has its opposite sides parallel; so it is a parallelogram.
 (iii) A square is a parallelogram with all the 4 sides equal; so it is a rhombus.
 (iv) A square is a parallelogram with each angle a right angle; so it is a rectangle.
4. (i) Parallelogram; rhombus; square; rectangle.
 (ii) Rhombus; square (iii) Square; rectangle
5. Both of its diagonals lie in its interior.
6. $\overline{AD} \parallel \overline{BC}; \overline{AB} \parallel \overline{DC}$. So, in parallelogram ABCD, the mid-point of diagonal $\overline{AC}$ is O.

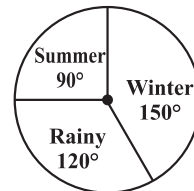
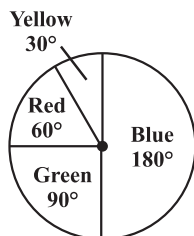


EXERCISE 4.1

1. (i) 200 (ii) Lightmusic (iii) Classical - 100, Semi classical - 200, Light - 400, Folk - 300

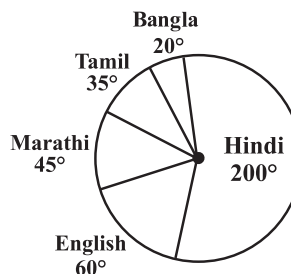
2. (i) Winter (ii) Winter - 150° , Rainy - 120° , Summer - 90° (iii)

3.



4. (i) Hindi (ii) 30 marks (iii) Yes

5.

**EXERCISE 4.2**

1. (a) Outcomes $\rightarrow$ A, B, C, D

(b) HT, HH, TH, TT (Here HT means Head on first coin and Tail on the second coin and so on).

2. Outcomes of an event of getting

(i) (a) 2, 3, 5 (b) 1, 4, 6

(ii) (a) 6 (b) 1, 2, 3, 4, 5

3. (a) $\frac{1}{5}$ (b) $\frac{1}{13}$ (c) $\frac{4}{7}$

4. (i) $\frac{1}{10}$ (ii) $\frac{1}{2}$ (iii) $\frac{2}{5}$ (iv) $\frac{9}{10}$

5. Probability of getting a green sector = $\frac{3}{5}$; probability of getting a non-blue sector = $\frac{4}{5}$

6. Probability of getting a prime number = $\frac{1}{2}$

probability of getting a number which is not prime = $\frac{1}{2}$

Probability of getting a number greater than 5 = $\frac{1}{6}$

Probability of getting a number not greater than 5 = $\frac{5}{6}$



EXERCISE 5.1

- 1
 - 4
 - 1
 - 9
 - 6
 - 9
 - 4
 - 0
 - 6
 - 5
- These numbers end with
 - 7
 - 3
 - 8
 - 2
 - 0
 - 2
 - 0
 - 0
- (i), (iii)
- 10000200001, 100000020000001
- 1020304030201, 101010101^2
- 20, 6, 42, 43
- 25
 - 100
 - 144
- $1 + 3 + 5 + 7 + 9 + 11 + 13$
 - $1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21$
- 24
 - 50
 - 198

EXERCISE 5.2

- 1024
 - 1225
 - 7396
 - 8649
 - 5041
 - 2116
- 6, 8, 10
 - 14, 48, 50
 - 16, 63, 65
 - 18, 80, 82

EXERCISE 5.3

- 1, 9
 - 4, 6
 - 1, 9
 - 5
- (i), (ii), (iii)
- 10, 13
- 27
 - 20
 - 42
 - 64
 - 88
 - 98
 - 77
 - 96
 - 23
 - 90
- 7; 42
 - 5; 30
 - 7; 84
 - 3; 78
 - 2; 54
 - 3; 48
- 7; 6
 - 13; 15
 - 11; 6
 - 5; 23
 - 7; 20
 - 5; 18
- 49
- 45 rows; 45 plants in each row
- 900
- 3600

EXERCISE 5.4

- 48
 - 67
 - 59
 - 23
 - 57
 - 37
 - 76
 - 89
 - 24
 - 32
 - 56
 - 30
- 1
 - 2
 - 2
 - 3
 - 3
- 1.6
 - 2.7
 - 7.2
 - 6.5
 - 5.6
- 2; 20
 - 53; 44
 - 1; 57
 - 41; 28
 - 31; 63



5. (i) 4; 23 (ii) 14; 42 (iii) 4; 16 (iv) 24; 43 (v) 149; 81
 6. 21 m 7. (a) 10 cm (b) 12 cm
 8. 24 plants 9. 16 children

EXERCISE 6.1

1. (ii) and (iv)
 2. (i) 3 (ii) 2 (iii) 3 (iv) 5 (v) 10
 3. (i) 3 (ii) 2 (iii) 5 (iv) 3 (v) 11
 4. 20 cuboids

EXERCISE 6.2

1. (i) 4 (ii) 8 (iii) 22 (iv) 30 (v) 25 (vi) 24
 (vii) 48 (viii) 36 (ix) 56 (x) 45
 2. (i) False (ii) True (iii) False (iv) False (v) False (vi) False
 (vii) True

EXERCISE 7.1

1. (a) 1 : 2 (b) 1 : 2000 (c) 1 : 10
 2. (a) 75% (b) $66\frac{2}{3}\%$ 3. 28% students 4. 25 matches 5. ₹ 2400
 6. 10%, cricket → 30 lakh; football → 15 lakh; other games → 5 lakh

EXERCISE 7.2

1. ₹ 2,835 2. ₹ 14,560 3. ₹ 2,000
 4. ₹ 5000 5. ₹ 1,050

EXERCISE 7.3

1. (i) 48,980 (approx) (ii) 59,535 2. 5,31,616 (approx) 3. ₹ 38,640

EXERCISE 8.1

1. (i) 0 (ii) $ab + bc + ac$ (iii) $-p^2q^2 + 4pq + 9$
 (iv) $2(l^2 + m^2 + n^2 + lm + mn + nl)$
 2. (a) $8a - 2ab + 2b - 15$ (b) $2xy - 7yz + 5zx + 10xyz$
 (c) $p^2q - 7pq^2 + 8pq - 18q + 5p + 28$

EXERCISE 8.2

1. (i) $28p$ (ii) $-28p^2$ (iii) $-28p^2q$ (iv) $-12p^4$ (v) 0
 2. pq ; $50mn$; $100x^2y^2$; $12x^3$; $12mn^2p$
 3.

First monomial → Second monomial ↓	$2x$	$-5y$	$3x^2$	$-4xy$	$7x^2y$	$-9x^2y^2$
$2x$	$4x^2$	$-10xy$	$6x^3$	$-8x^2y$	$14x^3y$	$-18x^3y^2$
$-5y$	$-10xy$	$25y^2$	$-15x^2y$	$20xy^2$	$-35x^2y^2$	$45x^2y^3$
$3x^2$	$6x^3$	$-15x^2y$	$9x^4$	$-12x^3y$	$21x^4y$	$-27x^4y^2$
$-4xy$	$-8x^2y$	$20xy^2$	$-12x^3y$	$16x^2y^2$	$-28x^3y^2$	$36x^3y^3$
$7x^2y$	$14x^3y$	$-35x^2y^2$	$21x^4y$	$-28x^3y^2$	$49x^4y^2$	$-63x^4y^3$
$-9x^2y^2$	$-18x^3y^2$	$45x^2y^3$	$-27x^4y^2$	$36x^3y^3$	$-63x^4y^3$	$81x^4y^4$

4. (i) $105a^7$ (ii) $64pqr$ (iii) $4x^4y^4$ (iv) $6abc$
 5. (i) $x^2y^2z^2$ (ii) $-a^6$ (iii) $1024y^6$ (iv) $36a^2b^2c^2$ (v) $-m^3n^2p$

EXERCISE 8.3

1. (i) $4pq + 4pr$ (ii) $a^2b - ab^2$ (iii) $7a^3b^2 + 7a^2b^3$
 (iv) $4a^3 - 36a$ (v) 0
 2. (i) $ab + ac + ad$ (ii) $5x^2y + 5xy^2 - 25xy$
 (iii) $6p^3 - 7p^2 + 5p$ (iv) $4p^4q^2 - 4p^2q^4$
 (v) $a^2bc + ab^2c + abc^2$
 3. (i) $8a^{50}$ (ii) $-\frac{3}{5}x^3y^3$ (iii) $-4p^4q^4$ (iv) x^{10}
 4. (a) $12x^2 - 15x + 3$; (i) 66 (ii) $\frac{-3}{2}$
 (b) $a^3 + a^2 + a + 5$; (i) 5 (ii) 8 (iii) 4
 5. (a) $p^2 + q^2 + r^2 - pq - qr - pr$ (b) $-2x^2 - 2y^2 - 4xy + 2yz + 2zx$
 (c) $5l^2 + 25ln$ (d) $-3a^2 - 2b^2 + 4c^2 - ab + 6bc - 7ac$

EXERCISE 8.4

1. (i) $8x^2 + 14x - 15$ (ii) $3y^2 - 28y + 32$ (iii) $6.25l^2 - 0.25m^2$
 (iv) $ax + 5a + 3bx + 15b$ (v) $6p^2q^2 + 5pq^3 - 6q^4$ (vi) $3a^4 + 10a^2b^2 - 8b^4$
 2. (i) $15 - x - 2x^2$ (ii) $7x^2 + 48xy - 7y^2$ (iii) $a^3 + a^2b^2 + ab + b^3$
 (iv) $2p^3 + p^2q - 2pq^2 - q^3$



3. (i) $x^3 + 5x^2 - 5x$ (ii) $a^2b^3 + 3a^2 + 5b^3 + 20$ (iii) $t^3 - st + s^2t^2 - s^3$
 (iv) $4ac$ (v) $3x^2 + 4xy - y^2$ (vi) $x^3 + y^3$
 (vii) $2.25x^2 - 16y^2$ (viii) $a^2 + b^2 - c^2 + 2ab$

EXERCISE 9.1

1. 0.88 m^2 2. 7 cm 3. 660 m^2 4. 252 m^2
 5. 45 cm^2 6. $24 \text{ cm}^2, 6 \text{ cm}$ 7. ₹ 810 8. 140 m
 9. 119 m^2 10. Area using Jyoti's way = $2 \times \frac{1}{2} \times \frac{15}{2} \times (30 + 15) \text{ m}^2 = 337.5 \text{ m}^2$,

$$\text{Area using Kavita's way} = \frac{1}{2} \times 15 \times 15 + 15 \times 15 = 337.5 \text{ m}^2$$

11. $80 \text{ cm}^2, 96 \text{ cm}^2, 80 \text{ cm}^2, 96 \text{ cm}^2$

EXERCISE 9.2

1. (a) 2. 144 m 3. 10 cm 4. 11 m^2
 5. 5 cans
 6. Similarity → Both have same heights. Difference → one is a cylinder, the other is a cube. The cube has larger lateral surface area
 7. 440 m^2 8. 322 cm 9. 1980 m^2 10. 704 cm^2

EXERCISE 9.3

1. (a) Volume (b) Surface area (c) Volume
 2. Volume of cylinder B is greater; Surface area of cylinder B is greater.
 3. 5 cm 4. 450 5. 1 m 6. 49500 L
 7. (i) 4 times (ii) 8 times 8. 30 hours

EXERCISE 10.1

1. (i) $\frac{1}{9}$ (ii) $\frac{1}{16}$ (iii) 32
 2. (i) $\frac{1}{(-4)^3}$ (ii) $\frac{1}{2^6}$ (iii) $(5)^4$ (iv) $\frac{1}{(3)^2}$ (v) $\frac{1}{(-14)^3}$
 3. (i) 5 (ii) $\frac{1}{2}$ (iii) 29 (iv) 1 (v) $\frac{81}{16}$

4. (i) 250 (ii) $\frac{1}{60}$ 5. $m = 2$ 6. (i) -1 (ii) $\frac{512}{125}$
7. (i) $\frac{625t^4}{2}$ (ii) 5^5

EXERCISE 10.2

1. (i) 8.5×10^{-12} (ii) 9.42×10^{-12} (iii) 6.02×10^{15}
 (iv) 8.37×10^{-9} (v) 3.186×10^{10}
2. (i) 0.00000302 (ii) 45000 (iii) 0.00000003
 (iv) 1000100000 (v) 5800000000000 (vi) 3614920
3. (i) 1×10^{-6} (ii) 1.6×10^{-19} (iii) 5×10^{-7}
 (iv) 1.275×10^{-5} (v) 7×10^{-2}
4. 1.0008×10^2

EXERCISE 11.1

1. No 2.
- | | | | | | |
|----------------------|---|----|----|----|-----|
| Parts of red pigment | 1 | 4 | 7 | 12 | 20 |
| Parts of base | 8 | 32 | 56 | 96 | 160 |
3. 24 parts 4. 700 bottles 5. 10^{-4} cm; 2 cm 6. 21 m
7. (i) 2.25×10^7 crystals (ii) 5.4×10^6 crystals 8. 4 cm
9. (i) 6 m (ii) 8 m 75 cm 10. 168 km

EXERCISE 11.2

1. (i), (iv), (v) 2. $4 \rightarrow 25,000$; $5 \rightarrow 20,000$; $8 \rightarrow 12,500$; $10 \rightarrow 10,000$; $20 \rightarrow 5,000$
 Amount given to a winner is inversely proportional to the number of winners.
3. $8 \rightarrow 45^\circ$, $10 \rightarrow 36^\circ$, $12 \rightarrow 30^\circ$ (i) Yes (ii) 24° (iii) 9
4. 6 5. 4 6. 3 days 7. 15 boxes
8. 49 machines 9. $1\frac{1}{2}$ hours 10. (i) 6 days (ii) 6 persons 11. 40 minutes

EXERCISE 12.1

1. (i) 12 (ii) $2y$ (iii) $14pq$ (iv) 1 (v) $6ab$ (vi) $4x$
 (vii) 10 (viii) x^2y^2

2. (i) $7(x-6)$ (ii) $6(p-2q)$ (iii) $7a(a+2)$ (iv) $4z(-4+5z^2)$
 (v) $10lm(2l+3a)$ (vi) $5xy(x-3y)$ (vii) $5(2a^2-3b^2+4c^2)$
 (viii) $4a(-a+b-c)$ (ix) $xyz(x+y+z)$ (x) $xy(ax+by+cz)$
3. (i) $(x+8)(x+y)$ (ii) $(3x+1)(5y-2)$ (iii) $(a+b)(x-y)$
 (iv) $(5p+3)(3q+5)$ (v) $(z-7)(1-xy)$

EXERCISE 12.2

1. (i) $(a+4)^2$ (ii) $(p-5)^2$ (iii) $(5m+3)^2$ (iv) $(7y+6z)^2$
 (v) $4(x-1)^2$ (vi) $(11b-4c)^2$ (vii) $(l-m)^2$ (viii) $(a^2+b^2)^2$
2. (i) $(2p-3q)(2p+3q)$ (ii) $7(3a-4b)(3a+4b)$ (iii) $(7x-6)(7x+6)$
 (iv) $16x^3(x-3)(x+3)$ (v) $4lm$ (vi) $(3xy-4)(3xy+4)$
 (vii) $(x-y-z)(x-y+z)$ (viii) $(5a-2b+7c)(5a+2b-7c)$
3. (i) $x(ax+b)$ (ii) $7(p^2+3q^2)$ (iii) $2x(x^2+y^2+z^2)$
 (iv) $(m^2+n^2)(a+b)$ (v) $(l+1)(m+1)$ (vi) $(y+9)(y+z)$
 (vii) $(5y+2z)(y-4)$ (viii) $(2a+1)(5b+2)$ (ix) $(3x-2)(2y-3)$
4. (i) $(a-b)(a+b)(a^2+b^2)$ (ii) $(p-3)(p+3)(p^2+9)$
 (iii) $(x-y-z)(x+y+z)[x^2+(y+z)^2]$ (iv) $z(2x-z)(2x^2-2xz+z^2)$
 (v) $(a-b)^2(a+b)^2$
5. (i) $(p+2)(p+4)$ (ii) $(q-3)(q-7)$ (iii) $(p+8)(p-2)$

EXERCISE 12.3

1. (i) $\frac{x^3}{2}$ (ii) $-4y$ (iii) $6pqr$ (iv) $\frac{2}{3}x^2y$ (v) $-2a^2b^4$
2. (i) $\frac{1}{3}(5x-6)$ (ii) $3y^4-4y^2+5$ (iii) $2(x+y+z)$
 (iv) $\frac{1}{2}(x^2+2x+3)$ (v) q^3-p^3
3. (i) $2x-5$ (ii) 5 (iii) $6y$ (iv) xy (v) $10abc$
4. (i) $5(3x+5)$ (ii) $2y(x+5)$ (iii) $\frac{1}{2}r(p+q)$ (iv) $4(y^2+5y+3)$
 (v) $(x+2)(x+3)$
5. (i) $y+2$ (ii) $m-16$ (iii) $5(p-4)$ (iv) $2z(z-2)$
 (v) $\frac{5}{2}q(p-q)$ (vi) $3(3x-4y)$ (vii) $3y(5y-7)$



EXERCISE 13.1

1. (a) 36.5°C (b) 12 noon (c) 1 p.m, 2 p.m.
 (d) 36.5°C ; The point between 1 p.m. and 2 p.m. on the x -axis is equidistant from the two points showing 1 p.m. and 2 p.m., so it will represent 1.30 p.m. Similarly, the point on the y -axis, between 36°C and 37°C will represent 36.5°C .
 (e) 9 a.m. to 10 a.m., 10 a.m. to 11 a.m., 2 p.m. to 3 p.m.
2. (a) (i) ₹ 4 crore (ii) ₹ 8 crore
 (b) (i) ₹ 7 crore (ii) ₹ 10 crore
 (c) ₹ 4 crore (d) 2005
3. (a) (i) 7 cm (ii) 9 cm
 (b) (i) 7 cm (ii) 10 cm
 (c) 2 cm (d) 3 cm (e) Second week (f) First week
 (g) At the end of the 2nd week
4. (a) Tue, Fri, Sun (b) 35°C (c) 15°C (d) Thursday
6. (a) 4 units = 1 hour (b) $3\frac{1}{2}$ hours (c) 22 km
 (d) Yes; This is indicated by the horizontal part of the graph (10 a.m. - 10.30 a.m.)
 (e) Between 8 a.m. and 9 a.m.
7. (iii) is not possible

EXERCISE 13.2

1. (b) (i) 20 km (ii) 7.30 a.m. (c) (i) Yes (ii) ₹ 200 (iii) ₹ 3500
2. (i) Yes (ii) No