

ANSWERS

Exercise 1 (A)

1. (i) $\sqrt{4}$, 5 and 8 (ii) $-7, 0, \sqrt{4}$, 5 and 8 (iii) -7 (iv) $-7, -6.5, 0, \frac{5}{3}, \frac{3}{-4}, 3.06, 0.05, \sqrt{4}$, 5 and 8
 (v) $\sqrt{2}$ and $\sqrt{8}$ (iv) All the given numbers 2. (i) True (ii) True (iii) False (iv) True (v) True (vi) True
 (vii) True 3. (i) Real number (R); Rational number (Q) (ii) R and Q (iii) R and Q
 (iv) R, Z and Q (v) Real and irrational number (vi) R and Q (vii) Z, R and Q (viii) Z, R and Q
 (ix) Z, R and Q (x) Z, R and Q (xi) Z, R and Q (xii) Z, R and Q
 (xiii) Real and irrational number (xiv) Real and irrational number (xv) Z, R and Q
 4. (i) 19, 7, 53, 31, 89, 2 and 73 (ii) 15, 27, 16, 68, 22, 45 and 96
 5. (i) $>$ (ii) $>$ (iii) $>$ (iv) $>$ (v) $<$ (vi) $<$ (vii) $>$ (viii) $>$ (ix) $<$
 6. (i) 24, 26, 46, 42, 62 and 64. (ii) 22, 24, 26, 42, 44, 46, 62, 64 and 66.
 7. (i) 55, 50, 53, 35, 30 and 33. (ii) 50, 53, 35 and 30.
 8. 805, 850, 508 and 580.

Exercise 1 (B)

1. (i) 42 (ii) 42 (iii) 27 (iv) 15 (v) -42 (vi) -12 (vii) 12 (viii) -15 (ix) -27 (x) 27 (xi) -27
 (xii) 0 (xiii) 0 (xiv) 0 (xv) 0 (xvi) not defined (xvii) 0 2. (i) 17 (ii) 21 (iii) 13 (iv) -19 (v) 21
 (vi) 12 3. (i) 195 (ii) 195 (iii) -195 (iv) 195 (v) -195 (vi) 7 (vii) -7 (viii) -7 (ix) 7 (x) -3
 (xi) -3 (xii) -5 4. (i) 139 (ii) -12 (iii) 17 (iv) 10 5. (i) -5 (ii) 179 (iii) 5 (iv) -179 (v) -58
 (vi) 58 6. (i) 192 (ii) -192 (iii) 192 (iv) -192 (v) 0 (vi) 0 7. (i) 7 (ii) -7 (iii) 7 (iv) -7
 (v) not defined (vi) 0 8. 165 9. 16. 10. 420

Exercise 2 (A)

1. (i) base and power (exponent) (ii) index (power) and base (iii) $2^{12}, 2^6$ and 2^9
 (iv) $4^3, 4^6$ and 4^{10} (v) 0 (vi) 1 (vii) $2^{3 \times 2} = 2^6 = 64$ (viii) 1, 1 and 1
 (ix) 1 and -1 (x) 1 and -1 2. (i) $4^2 = 16$ (ii) $3^3 = 27$ (iii) $5^3 = 125$ (iv) 7 (v) 1
 3. (i) $2^2 = 4$ (ii) $2^2 = 4$ (iii) 3 (iv) $5^3 = 125$ (v) $(-7)^2 = 49$ 4. (i) $5^2 = 25$ (ii) $3^1 = 3$ (iii) $7^2 = 49$
 (iv) $4^2 = 16$ 5. (i) 192 (iii) 100 (iii) -1

Exercise 2 (B)

1. (i) 25 (ii) -25 (iii) 25 (iv) 64 (v) -64 (vi) -64 (vii) 1 (viii) -1 (ix) 1
 2. (i) 1, 4, 9 and 16 (ii) 36, 49 and 64 (iii) 36, 64 and 100 (iv) 25 and 49 (v) 9, 36 and 81
 (vi) 25, 100, 225 and 400 (vii) 1, 0, 1 and 4 3. (i) 27, 64 and 125 (ii) 8, 64 and 216
 (iii) 1, 27, 125 and 343 (iv) 27, 216 and 729 (v) $-8, -1, 0$ and 1 4. (i) 36 (ii) 1 (iii) $\frac{16}{49}$
 (iv) $5\frac{4}{9}$ (v) $1\frac{11}{25}$ 5. (i) -343 (ii) 1331 (iii) $-\frac{27}{64}$ (iv) $2\frac{10}{27}$ (v) $-12\frac{19}{27}$ 6. (i) 20 (ii) 61
 (iii) 22 (iv) 412 (v) 199

Exercise 2 (C)

1. (i) 12 (ii) 9 (iii) 125 (iv) 24 (v) 600 (vi) 2 (vii) 320 (viii) $13\frac{1}{2}$ 2. (i) 20 (ii) 50 (iii) 25 (iv) 28
 (v) 32 (vi) 54 (vii) 45 (viii) 72 (ix) 126 (x) 105 (xi) 112 (xii) 130 (xiii) 264 (xiv) 1.4 (xv) 2.7
 (xvi) 5.6 (xvii) 0.13 (xviii) 0.09 (xix) 3 (xx) $1\frac{1}{7}$ (xxi) $1\frac{5}{6}$ 3. (i) 23 (ii) 47 (iii) 208 (iv) 253
 (v) 407 (vi) 1903 (vii) 238 (viii) 92.046 (ix) 3.6 (x) 4.57 (xi) 39.1 (xii) 12.23 (xiii) 40.08
 (xiv) 0.15 (xv) 1.06 4. 11 5. 2 6. 2 7. 81 8. (i) 21 (ii) -3 (iii) 1 (iv) $5\frac{1}{2}$ (v) $3\frac{3}{4}$
 (vi) $\frac{2}{11}$ (vii) $8\frac{1}{2}$ (viii) $\frac{7}{12}$ 9. 21 10. 17

Exercise 2 (D)

1. (i) x (ii) x (iii) 8 (iv) -1 2. (i) 1 (ii) 3 (iii) 11 (iv) 16 (v) 36 (vi) 20 3. (i) -1 (ii) -4 (iii) -12
 (iv) -9 (v) -60 (vi) -18 4. (i) $\frac{3}{5} = 0.6$ (ii) $1\frac{1}{2} = 1.5$ (iii) $-2\frac{1}{2} = -2.5$ (iv) 0.2 (v) 0.5
 (vi) -0.4 (vii) -0.1 (viii) $4\frac{1}{6}$ (ix) $2 \times 3^2 \times 4^3 = 1152$ (x) $(0.8)^2 \times 5 \times 2^3 = 25.6$ 5. (i) 147
 (ii) $\frac{25}{27}$ (iii) 11 (iv) 21 (v) $\frac{7}{10}$ (vi) $\frac{3}{4}$

Exercise 3 (A)

1. (i) 1 and 2 (ii) 1 and 5 (iii) 1, 2, 31 and 62 (iv) 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 45 and 90
 (v) 1 and 2 (vi) 1, 2, 3, 6, 9 and 18 (vii) 2 and 3 (viii) 2 and 3 (ix) 5 (x) 5 (xi) x (xii) 1 2. (i) True
 (ii) True (iii) True (iv) False (v) False (vi) True (vii) False (viii) True (ix) True 3. (i) 5 (ii) 1
 (iii) 14 (iv) 9 (v) 12 4. (i) 15 (ii) 4 (iii) 36 (iv) 18 (v) 28 5. (i) 25 (ii) 18 (iii) 9 (iv) 13 (v) 8
 6. 41 7. 75 8. (i) 200 (ii) 48

Exercise 3 (B)

1. (i) 360 (ii) 630 (iii) 1960 (iv) 46800 (v) 2730 2. (i) 630 (ii) 2184 (iii) 4032 3. 1260 4. 1480
 5. 727 6. 1448 7. 384 8. 36 9. 297 10. 1309 11. (ii) and (iii) 12. (i) Yes (ii) H.C.F. = 1 and
 L.C.M. = 1440 13. H.C.F. = 12 and L.C.M. = 480

Exercise 4 (A)

1. (i) Vulgar and proper (ii) Decimal and improper (iii) Decimal and proper (iv) Vulgar and
 improper (v) Mixed 2. (i) $3\frac{3}{5}$ (ii) $1\frac{3}{4}$ (iii) $4\frac{1}{6}$ (iv) $7\frac{3}{5}$ (v) $4\frac{2}{5}$ 3. (i) $\frac{22}{9}$ (ii) $\frac{96}{13}$
 (iii) $\frac{13}{4}$ (iv) $\frac{101}{48}$ (v) $\frac{139}{11}$ 4. (i) $\frac{4}{9}$ (ii) $\frac{3}{4}$ (iii) $\frac{3}{7}$ (iv) $\frac{7}{15}$ (v) $\frac{2}{5}$ 5. (i) True (ii) False
 (iii) True 6. (i) Simple (ii) Simple (iii) Simple (iv) Complex (v) Complex (vi) Complex
 (vii) Complex (viii) Neither

Exercise 4 (B)

1. (i) Like (ii) Unlike (iii) Unlike 2. (i) $\frac{15}{18}$ and $\frac{14}{18}$ (ii) $\frac{8}{12}$, $\frac{10}{12}$ and $\frac{7}{12}$
 (iii) $\frac{64}{80}$, $\frac{68}{80}$, $\frac{46}{80}$ and $\frac{55}{80}$ 3. (i) $\frac{24}{27}$ and $\frac{24}{34}$ (ii) $\frac{60}{130}$, $\frac{60}{92}$ and $\frac{60}{85}$
 (iii) $\frac{225}{285}$, $\frac{225}{252}$, $\frac{225}{275}$ and $\frac{225}{235}$ 4. (i) $\frac{1}{6}$, $\frac{1}{3}$, $\frac{2}{5}$, $\frac{3}{4}$ (ii) $\frac{3}{10}$, $\frac{5}{6}$, $\frac{7}{8}$, $\frac{11}{12}$
 (iii) $\frac{3}{8}$, $\frac{9}{14}$, $\frac{5}{7}$, $\frac{20}{21}$ 5. (i) $\frac{8}{9}$, $\frac{5}{6}$, $\frac{1}{3}$, $\frac{4}{15}$ (ii) $\frac{8}{11}$, $\frac{5}{7}$, $\frac{4}{9}$, $\frac{3}{7}$
 (iii) $\frac{8}{11}$, $\frac{3}{5}$, $\frac{6}{11}$, $\frac{1}{10}$ 6. (i) $\frac{11}{15}$ (ii) $\frac{4}{5}$ (iii) $\frac{6}{7}$ 7. (i) $\frac{7}{16}$ (ii) $2\frac{1}{2}$ (iii) $\frac{1}{2}$
 8. (i) $\frac{2}{5}$, $\frac{5}{12}$, $\frac{3}{7}$, $\frac{7}{16}$, $\frac{4}{9}$ (ii) $\frac{1}{2}$, $\frac{3}{5}$, $\frac{2}{3}$, $\frac{7}{10}$, $\frac{5}{7}$ (iii) $\frac{3}{8}$, $\frac{4}{9}$, $\frac{9}{19}$, $\frac{1}{2}$, $\frac{6}{11}$
 9. (i) 1 , $\frac{1}{3}$, $\frac{2}{7}$, $\frac{3}{11}$ (ii) $\frac{5}{9}$, $\frac{6}{13}$, $\frac{7}{17}$, $\frac{1}{4}$ (iii) $\frac{5}{6}$, 1 , $1\frac{1}{6}$, $1\frac{1}{5}$

Exercise 4 (C)

1. (i) $1\frac{1}{6}$ (ii) $\frac{1}{2}$ (iii) $\frac{1}{2}$ (iv) $3\frac{7}{12}$ (v) 1 (vi) $2\frac{13}{15}$ (vii) $\frac{17}{30}$ (viii) $3\frac{7}{12}$ (ix) $5\frac{5}{24}$
 2. (i) $4\frac{1}{2}$ (ii) 10 (iii) $\frac{3}{8}$ (iv) $\frac{3}{7}$ (v) 105 (vi) 117 (vii) 6 (viii) $7\frac{1}{2}$ (ix) $1\frac{2}{3}$ (x) $1\frac{1}{3}$ (xi) $-\frac{5}{6}$
 (xii) $3\frac{1}{5}$ (xiii) $4\frac{2}{7}$ 3. (i) $-1\frac{1}{3}$ (ii) $\frac{1}{2}$ (iii) $\frac{4}{5}$ (iv) $\frac{6}{7}$ (v) $-\frac{4}{5}$ (vi) $\frac{26}{45}$ (vii) $\frac{2}{77}$
 4. (i) 5 kg (ii) 36 minutes (iii) $1\frac{1}{3}$ kg (iv) 7 metres (v) $1\frac{1}{3}$ (vi) 8 kg
 5. (i) $\frac{4}{5}$ (ii) $\frac{3}{35}$ (iii) $4\frac{1}{5}$ (iv) 2 (v) $\frac{3}{11}$ (vi) $5\frac{1}{4}$ (vii) $\frac{2}{9}$ (viii) $\frac{20}{27}$ (ix) 0 (x) $1\frac{13}{14}$ (xi) $1\frac{11}{21}$
 (xii) $\frac{21}{50}$ (xiii) $\frac{9}{32}$

Exercise 4 (D)

1. $7\frac{3}{4}$ 2. $6\frac{2}{5}$ 3. $-\frac{61}{240}$ 4. $\frac{1}{4}$ 5. -1 6. $-4\frac{11}{50}$ 7. $2\frac{4}{19}$ 8. $4\frac{1}{5}$ 9. $20\frac{103}{250}$ 10. $\frac{3}{7}$ 11. $3\frac{6}{7}$

Exercise 4 (E)

1. (i) $\frac{2}{5}$ (ii) $\frac{3}{5}$ (iii) $\frac{1}{2}$ 2. 2 3. (i) he sold $30\frac{1}{2}$ kg (ii) he is left with $89\frac{1}{2}$ kg
 4. ₹ 1,575 5. $13\frac{13}{18}$ metres 6. Ram's investment = ₹ 24,000 and Deepak's investment = ₹ 16,000 7. 10 8. ₹ 67.50 9. 157.5 kg 10. 17 11. $8\frac{1}{12}$
 12. $67\frac{67}{80}$ kg 13. $\frac{3}{10}$ 14. $\frac{21}{50}$ 15. ₹ 375 16. (i) $\frac{1}{6}$ (ii) 20 m 17. ₹ 5,000 18. 800
 19. ₹ 52,500; ₹ 22,500 20. $5\frac{1}{3}$ km 21. $62\frac{1}{2}$ km

Exercise 5 (A)

1. (i) $\frac{15}{4}$ (ii) $\frac{1}{2}$ (iii) $\frac{51}{25}$ (iv) $\frac{13}{20}$ (v) $\frac{481}{200}$ (vi) $\frac{17}{200}$ (vii) $\frac{321}{40}$ 2. (i) 2.8 (ii) 0.79
 (iii) 0.0037 (iv) 0.7543 (v) 0.75 (vi) 9.6 (vii) 8.625 (viii) 5.875 3. (i) 4 (ii) 5 (iii) 3
 (iv) 1 (v) 3 (vi) 6
 4. (i) zero-point-four; zero-point nine; zero-point-one.
 (ii) one-point-nine; four-point-four; seven-point-five.
 (iii) zero-point-zero-two; zero-point-five-six; thirteen-point-zero-six.
 (iv) zero-point-zero-zero-five; zero-point-two-zero-seven;
 one hundred eleven-point-five-one-nine.
 (v) zero-point-eight; zero-point-zero-eight; zero-point-zero-zero-eight;
 zero-point-zero-zero-zero-eight.
 (vi) two hundred fifty six-point-one; ten-point-two-two; zero-point-six-three-four.

Exercise 5 (B)

1. (i) 0.87 (ii) 12.5 (iii) 0.337 (iv) 1.2531 (v) 19.316 (vi) 21.935 (vii) 2.2202 (viii) 67.5488
 (ix) 36.5303 (x) 18.4071 2. (i) 4.4 (ii) 4.14 (iii) 7.78 (iv) 8.36 (v) 7.188 (vi) 18.43 (vii) 22.94
 (viii) 3.77 (ix) 23.57 (x) 2.865 3. (i) 12.821 (ii) 17.489 (iii) 14.21 (iv) 99.9458 (v) 12.592
 (vi) 3146.959 (vii) 37.484 (viii) 207.97 (ix) 605.005 4. 6.165 5. 124.706 6. 5.959 7. 40.788
 8. 80.71 9. 370.34 10. (i) 6.108 (ii) -1.62 (iii) 9.542 (iv) 800.254

Exercise 5 (C)

1. (i) 8.7 (ii) 294.8 (iii) 6400 (iv) 23.2 (v) 456.96 (vi) 40.296 (vii) 9.66 (viii) 3.6352
 2. (i) 5, 50, 500 (ii) 1.12, 11.2, 112 (iii) 48, 480, 4800 (iv) 0.359, 3.59, 35.9 (v) 162.7, 1627, 16270
 (vi) 2348, 23480, 234800 3. (i) 13.5631 (ii) 77.778 (iii) 0.00001 (iv) 7.392 (v) 1.14 (vi) 40.32
 (vii) 0.24 (viii) 0.000027 4. (i) 5.49 (ii) 0.078 (iii) 0.32476 (iv) 3.2 (v) 3.102 (vi) 0.584 (vii) 3.6
 (viii) 5.46 (ix) 60.54 5. (i) 0.21, 0.021, 0.0021, 0.00021 (ii) 0.864, 0.0864, 0.00864, 0.000864
 (iii) 0.501, 0.0501, 0.00501, 0.000501 (iv) 0.00906, 0.000906, 0.0000906, 0.00000906
 (v) 0.0125, 0.00125, 0.000125, 0.0000125 (vi) 11.111, 1.1111, 0.11111, 0.011111
 6. (i) 1.95 (ii) 1.1016 (iii) 0.923 (iv) 0.77 (v) 1.29 (vi) 0.356 (vii) 0.005 (viii) 0.00203 (ix) 0.000479
 (x) 1526 (xi) 70 7. (i) Terminating (ii) Non-terminating (iii) Terminating (iv) Non-terminating
 (v) Terminating (vi) Non-terminating (vii) Non-terminating (viii) Non-terminating 8. (i) $1.\bar{3}$ (ii) $0.\overline{90}$
 (iii) $0.8\bar{3}$ (iv) $0.\overline{153846}$ (v) $0.\bar{1}$ (vi) $0.1\bar{8}$ (vii) $0.2\bar{7}$ (viii) $0.58\bar{3}$

Exercise 5 (D)

1. (i) 0.1, 0.1, 3.6, 9.5 (ii) 0.63, 100.48, 0.07, 0.02 (iii) 5, 1, 452, 9 2. (i) 22.02 (ii) 1.26,
 3. (i) 4 (ii) 2 (iii) 5 (iv) 3 (v) 2 (vi) 3 (vii) 1 (viii) 2 4. (i) 35.9, 0.00843, 4.95, 383
 (ii) 60.97, 2.875, 0.001789, 400.0 (iii) 14.295, 19.200, 46357, 69.000

Exercise 5 (E)

1. 146.88 kg 2. ₹ 1968.75 3. ₹ 715.65 4. 6.4 kg 5. ₹ 136.80 6. (i) ₹ 52.40
(ii) 17.222 kg (iii) 37.272 (iv) 230.012 7. (i) 0.5 (ii) 24 (iii) 288 (iv) 0.045 (v) 3 (vi) 0.19008

Exercise 6 (A)

1. (i) ₹ $\frac{72}{4}$; ₹ 18 (ii) 8×16 ; 128 (iii) $\frac{52.50}{7}$; 7.50 (iv) 5 days (v) 6.75 m (vi) ₹ 160 2. 6.6 kg
3. 15 4. 4 hours 5. 54 minutes 6. 290 minutes 7. 50 days 8. 20 weeks 9. 40 days 10. 32 days
11. ₹ 93.75 12. ₹ 150 13. ₹ 216 14. ₹ 384 15. 204 16. 15 days [All the pupil consume same
amount of food every day] 17. 6 hrs per day.

Exercise 6 (B)

1. (i) ₹ 160 (ii) ₹ 100 2. ₹ 208 3. 12 hours 4. 4 days 23 hours 5. 10 days 6. (i) ₹ 20 (ii) ₹ 80
7. 400 apples 8. 100 litres 9. 10 days 10. 15 days.

Exercise 6 (C)

1. $3\frac{3}{7}$ days 2. 30 days 3. (i) $\frac{9}{20}$ (ii) $\frac{9}{10}$; $\frac{1}{10}$ 4. $\frac{7}{18}$, $\frac{11}{18}$ 5. 5 days 6. $6\frac{6}{19}$ 7. (i) $\frac{2}{5}$
(ii) $\frac{3}{5}$ (iii) 24 days 8. (i) $\frac{9}{25}$ (ii) $\frac{16}{25}$ (iii) 16 hrs 9. (i) $\frac{1}{30}$ (ii) $\frac{1}{30}$ (iii) 15 hrs 10. (i) $1\frac{5}{7}$ days
(ii) 24 days

Exercise 7 (A)

1. (i) 5 (ii) 0.14 (iii) 20 (iv) 40 (v) 27000 ; 27 (vi) 900 (vii) 30 (viii) $150 ; 2\frac{1}{2}$ 2. 17 km/h ;
8.5 km 3. 500 m/minute 4. 72 km/h 5. 50 m/sec ; 2500 m = 2.5 km 6. (i) 70 km/h (ii) 434 km
(iii) 3 hours 7. (i) 60 km (ii) 2.4 hours = 2 hours 24 min (iii) 1.2 min = 1 min 12 seconds
8. 8 km/h 9. $11\frac{1}{9}$ km/h 10. $59\frac{1}{11}$ Km/h 11. 1188 km/h, 300 sec = 5 min

Exercise 7 (B)

1. (i) 15 m/s (ii) 9 km/h (iii) 4.5 m/s (iv) 32.4 km/h (v) 480 km/h (vi) $133\frac{1}{3}$ m/s (vii) 0.75 m/s ;
2.7 km/h (viii) 0.02 m/s ; 0.072 km/h (ix) 2 m/s ; 120 m/min 2. 7.2 sec 3. 54 km/h 4. 11 sec
5. (a) (i) 1 km (ii) 0.05 km = 50 m (b) (i) 25 min (ii) 65 min = 1 hour 5 min 6. 45 km/h is greater.
25 m and 24.5 m 7. (i) 18 km (ii) 162 km 8. B will be 6 km ahead of A 9. (i) 4 hrs (ii) 30 km h⁻¹
10. (i) $\frac{2}{3}$ m s⁻¹ (ii) 2.4 km h⁻¹ 11. 1.5 m s⁻¹ ; 5 min. 20 sec.

Exercise 8 (A)

1. (i) 1 : 3 (ii) 3 : 5 (iii) 1 : 2 (iv) 2 : 5 (v) 1 : 10 (vi) 1 : 25 (vii) 1 : 8 (viii) 3 : 8 (ix) 16 : 27 : 30
2. 40 cm and 24 cm 3. x gets ₹ 320 and y gets ₹ 400 4. 45°, 30°, 105° 5. (i) 5 : 4 (ii) 2 : 9
6. 1200, 1512, 2205 7. ₹ 1080 8. 25, 35 9. 80, 88 10. 102.6 cm 11. 8/15 12. (i) 120,000
(ii) 2 : 3 13. (i) 3 : 1 (ii) 1 : 4 14. ₹ 1,500 and ₹ 1,650 15. ₹ 4,500; ₹ 2,700 and ₹ 7,200
16. 225 sq. m and 375 sq. m 17. 11.25 m

Exercise 8 (B)

1. (i) 5 (ii) 15 (iii) 104 (iv) 5.7 (v) $\frac{2}{65}$ 2. (i) Yes (ii) Yes (iii) Yes (iv) No (v) No 3. (i) 16
 (ii) 81 (iii) 6.0 (iv) 10.08 (v) 4 hours 4. (i) 3 (ii) $6\frac{2}{3}$ cm (iii) 0.2 (iv) $\frac{9}{28}$ (v) 0.4 5. (i) 8 (ii) 9
 (iii) 1.5 (iv) 2.4 (v) $\frac{1}{8}$ 6. (i) 12 : 20 : 35 (ii) 10 : 15 : 21 (iii) 4 : 21 (iv) 27 : 16 (v) 5 : 14
 (vi) 45 : 98

Exercise 9 (A)

1. (i) 75% (ii) $66\frac{2}{3}\%$ (iii) 2.5% (iv) 12.5% 2. (i) $\frac{3}{40}$, 0.075 (ii) $\frac{1}{40}$, 0.025 (iii) $\frac{1}{5000}$, 0.0002
 (iv) $1\frac{3}{4}$, 1.75 3. (i) $33\frac{1}{3}\%$ (ii) 20% (iii) $6\frac{1}{4}\%$ (iv) 12% 4. (i) ₹ 17.50 (ii) ₹ 40.04 (iii) ₹ 5
 (iv) 10 kg (v) ₹ 3.75 (vi) 9m 5. 42 6. A = 4800, B = 3200 7. ₹ 2,200 8. 200 9. ₹ 23,750
 10. $54\frac{6}{11}\%$

Exercise 9 (B)

1. 198 2. Chandra got 54 and Ram got 48; $88\frac{8}{9}\%$ 3. 342; 38% 4. 50% 5. 40% 6. $19\frac{3}{13}\%$
 7. (i) 6000 (ii) 2500 (iii) 180 8. ₹ 5,00,000 9. $66\frac{2}{3}\%$ 10. ₹ 70 11. 225 kg

Exercise 9 (C)

1. $41\frac{2}{3}\%$ 2. (i) 63 (ii) 23 (iii) 54 (iv) 192 (v) 1035 3. (i) 64 (ii) 270 (iii) 43.75
 4. (i) 80 (ii) 200 (iii) 200 (iv) 800 (v) 50 (vi) 100 5. ₹ 50,000; ₹ 10,000 6. ₹ 50 7. ₹ 400
 8. (i) 1 : 4 (ii) 4 : 3 10. (i) $\frac{13}{10}$ (ii) $\frac{23}{13}$ (iii) $-\frac{10}{3}$ 11. 2% 12. 414 litres
 13. copper 52%, zinc 28% and nickel 20% 14. 900 15. (i) 270 (ii) 22.5%

Exercise 10 (A)

1. (i) 12% gain (ii) Loss = $11\frac{1}{9}\%$ (iii) 4% gain (iv) $33\frac{1}{3}\%$ loss (v) Loss = $16\frac{2}{3}\%$ 2. (i) ₹ 625
 (ii) ₹ 52.50 3. Profit = 20% 4. ₹ 420 5. ₹ 1,190 6. Profit = 25% 7. Loss = 10% 8. Profit = 27.5%
 9. (i) ₹ 1500 (ii) Profit = 25% 10. (i) ₹ 1,500 (ii) Loss = 20%

Exercise 10 (B)

1. (i) ₹ 20 (ii) ₹ 25 (iii) ₹ 320 (iv) ₹ 250 (v) ₹ 1.05 2. ₹ 900 3. ₹ 8,000 4. (i) ₹ 2,400 (ii) ₹ 2,760
 5. (i) ₹ 8,000 (ii) ₹ 8,960 6. (i) ₹ 6.90 (ii) ₹ 276 7. (i) ₹ 500 and ₹ 750
 (ii) Total CP = ₹ 1,250; total S.P. = ₹ 1,200 (iii) Loss = 4% 8. (i) ₹ 4 (ii) ₹ 32
 9. C.P. = ₹ 4,500 ; S.P. = ₹ 4,860 10. (i) ₹ 1,100 (ii) Profit = 15%

Exercise 10 (C)

1. ₹ 4,500 2. 10% 3. (i) ₹ 48 (ii) ₹ 272 4. (i) ₹ 90 (ii) 20% 5. (i) ₹ 360 (ii) ₹ 36 (iii) ₹ 324 (iv) 8% 6. (i) ₹ 1,600 (ii) ₹ 48,400 7. (i) ₹ 2,880 (ii) 15.2% 8. ₹ 800 9. ₹ 700 10. (i) ₹ 1,300 (ii) ₹ 1,560 11. (i) ₹ 12.50 (ii) ₹ 16 (iii) ₹ 3.50 (iv) 28% (v) ₹ 500 (vi) ₹ 640 (vii) ₹ 140 (viii) 28% yes, results of parts (iv) and (viii) are same. If we know the C.P. and the S.P. of equal number of articles, which may be 1 (one), 40 or 100, etc.; the profit percent in all the cases will be the same. 13. 20% loss 14. (i) ₹ 45 (ii) ₹ 315 15. 28%

Exercise 11

1. (i) ₹ 30; ₹ 180 (ii) ₹ 98; ₹ 448 (iii) ₹ 198.40; ₹ 818.40 (iv) ₹ 380.25; ₹ 3,760.25 (v) ₹ 24; ₹ 624 (vi) ₹ 8.50; ₹ 858.50 (vii) ₹ 135; ₹ 360 2. ₹ 3,200 3. $1\frac{1}{2}$ years 4. $12\frac{1}{2}$ years 5. 8 years 6. 4% 7. ₹ 500 8. 6% 9. 4 years 10. 32% 11. ₹ 1,200 12. (i) 5% (ii) ₹ 600 13. (i) ₹ 2,040 (ii) 20 years 14. 7%

Exercise 12

1. (i) 2.8 (ii) 12 2. 3.9 cm 3. 51 kg 4. $14\frac{4}{5}$ years 5. 1 year 6. 450 7. $13\frac{1}{3}$ years = 13 years 4 months 8. 22°C 9. 26 years 10. $\left(41\frac{1}{3}\right)^\circ$

Exercise 13 (A)

1. (i) constant, variable, variable (ii) variable, constant, variable (iii) variable, variable, variable (iv) algebraic expression, three (v) algebraic expression, two (vi) algebraic expression, two (vii) polynomial (viii) polynomial (ix) three, two or more than two, more than three (x) 7, x, y and z (xi) 1, 7, x, y, z, 7x, 7y, 7z, xy, yz, xz, 7xy, 7yz, 7xz, xyz and 7xyz (xii) 2, 3 (xiii) 9 (xiv) unlike, like (xv) equal (same) (xvi) equal, unequal. 2. 8 is the only constant term and each of the remaining terms is variable. 3. (i) Monomial (ii) Binomial (iii) Monomial (iv) Trinomial (v) Binomial (vi) Monomial (vii) Binomial (viii) Binomial (ix) Binomial 4. (i) $-3a$ (ii) p^2y (iii) -1 (iv) $-p^2$ 5. (i) 1 (ii) 3 (iii) 4 (iv) 5 (v) 7 (vi) 9 6. (i) 4 (ii) 8 (iii) 7 (iv) 3 (v) 1 (vi) 4 7. (i) $9x^2$, $-3x^2$ and x^2 ; xy and $-2xy$ (ii) ab and $-3ab$; $-a^2b$; $5a^2b$ and $-8a^2b$ (iii) $7p$, $-2p$ and $3p$; $8pq$ and $-5pq$ 8. (i) 1 (ii) -1 (iii) 2 (iv) -8 (v) 3 (vi) -9 9. (i) $-5x^3y^2z^2$ (ii) $-5x^3z^4$ (iii) $-5x^3yz^2$ (iv) $-5yz^4$ (v) $5x^2z^4$ (vi) x^2z^3 . The degree of given algebraic expression = $3 + 2 + 4 = 9$.

Exercise 13 (B)

1. (i) $13x$ (ii) $3x$ (iii) $15xy^2$ (iv) $-3xy^2$ (v) $14a + 5b$ (vi) $11 + 10xy$ (vii) $-3a + 7b$ (viii) $-2x + 8$ (ix) $2x^2y + 15xy^2$ (x) $7x^2$ and $8xy^2$ 2. (i) $-2x$ (ii) $19y^2$ (iii) $6pq$ 3. (i) $10m$ (ii) n^2 (iii) $11yz$ (iv) $-10ax^2$ (v) $-7am - 11mx$ 4. (i) $3a + 4b$ (ii) $5x - 3y$ (iii) $3b$ (iv) $9 + 5x$ 5. (i) $-3x + 17y + 17z$ (ii) $6a + 9b + 2c$ (iii) $5x^2 + 16xy - 7y^2$ (iv) $6x^2 - 10x + 18$ (v) $6x^2 + 2xy + 8y^2$ (vi) $3b^2 + 2ab + 2bc + 2ac + 5c^2$ (vii) $7ax - 2bx - 2$ (viii) ac (ix) $10a^2 + 7b^2 - 8ab$ (x) $-2x + 10$ (xi) $11x^3 - 2x^2 - 11x + 15$ 6. (i) $x + 3y$ (ii) $-2a + 5$ (iii) $-4x^2 + 7x$ (iv) $4a - 7b$ (v) $x^3 + 3x^2y + 2y^2$ (vi) $11 - by$ 7. $10x + 6y$ 8. $28a + 10b$ 9. (i) a (ii) $-3b - c$ (iii) $7b + 3a$ (iv) $a^3 + 2a^2 - 2a - 1$ (v) $p + 1$ (vi) $2x + 3y + 4z$ (vii) $-4ab - 8b^2$ (viii) $4pq - 15p^2 - 2q^2$

- (ix) $-2a^2 + 8abc + 4b^2$ (x) $ab + c^2 + d^2$ 10. (i) $8 - 5x$ (ii) $9c + 3d$ (iii) $3b + 5a + 6c$ (iv) $2p^2 - 12p$
 (v) $-a + 2b - 4c$ (vi) $2(xy - yz + xz)$ (vii) $x^2 + 2xy + 4y^2$ (viii) $-2a^2 + 5ab + 8b^2$
 (ix) $-11x^2 - 4x^2y - 4y^2 + 5xy^2$ (x) $-3m^3 - 4m^2 - 7m + 7$ 11. $9a^2 + 4a - 5$ 12. $4x^3 - 8x^2 + 2x - 7$
 13. $-3a^3 + 2a^2 - 6a + 7$ 14. $a^2 + 6ab - b^2$ 15. $3m^2 + n^2 + 9p^2$ 16. $x^3 - x^2y - 8xy^2 + 3y^3$ 17. 4
 18. $14x^3 + 2$ 19. $10a^2 + 5a + 18$ 20. (i) $8a^2 + 12b^2 - 4ab$ (ii) $-10b^2 - 8ab$ 21. (i) $21x^2 - 10xy + 11y^2$
 (ii) $3x^2 + 3y^2$ (iii) $18x^2 - 10xy + 8y^2$

Exercise 13 (C)

1. (i) $18x$ (ii) $18y$ (iii) $18xy$ (iv) $-30x^2$ (v) $16x^3y$ (vi) $4x^2y^6$ (vii) $56ay$ (viii) $20a^2b^3$ (ix) $-2m^2n$
 (x) $12m^2n^2$ (xi) a^2b^2 (xii) $-32pq^2$ (xiii) $-24abxy$ (xiv) $270x^2y^2$ 2. (i) $30x^3y^2$ (ii) $30a^2b^2$ (iii) $15x^2y + 6xy^2$
 (iv) $-12a^2 + 10ab$ (v) $16a^2 - 25b^2$ (vi) $18x^2y - 23xy^2 - 6y^3$ (vii) $-18m^4n^2 + 30m^3n^2 - 24m^3n^3$
 (viii) $-18x^3y^5 + 21x^4y^5 - 30x^5y^3$ 3. (i) $-9axy - 6bxy$ (ii) $-27x^2y + 15xy^2$ (iii) $-15x^3y^2 + 10x^4y + 30x^3y$
 (iv) $a^2 + b^2 + 2ab$ (v) $2a^2x^2 - 2abx + 2ab^2x - 2b^3$ (vi) $4a^2 - 10ab + 6ac + 4b^2 - 12bc$ (vii) $15m^2n + 36mn$
 $-10n^2 - 9m^3 - 18m^2$ (viii) $6 + 27x - 19x^2 + 13x^3 - 2x^4$ (ix) $-14x^3 - 10x^2 + 2x - 24 - 4x^5 + 18x^4$
 4. (i) $c^2 + 2c - 15$ (ii) $12c^2 - 38cd + 30d^2$ (iii) $\frac{1}{4}a^2 - \frac{1}{4}b^2$ (iv) $a^3 + 3a^2b + 3ab^2 + b^3$ (v) $12x^4 - 10x^3 + 20x^2$
 $-15x + 3$ (vi) $4m^3 + 18m^2 - 34m + 12$ (vii) $40 - 76x + 59x^2 - 44x^3 + 12x^4$ (viii) $8x^5 - 20x^4 + 14x^3 + 5x^2 -$
 $8x + 2$ (ix) $-30p^3 + 40p^2q - 10pq^2$ (x) $-60x^2y + 72xy^2 + 32xyz + 96y^3 - 64y^2z$ (xi) $a^3 + b^3 + c^3 - 3abc$
 5. (i) $a^2 - b^2$ (ii) $a^4 - b^4$ (iii) $a^8 - b^8$ 6. (i) $12x^2 + xy - 6y^2$ (ii) $96x^3 - 52x^2y - 53xy^2 + 30y^3$ (iii) $15a^3 + 68a^2$
 $-37a - 10$ (iv) $a^3 + 1; a^3 - 1$ and $2a^3$ (v) $625m^4 - 16n^4$

Exercise 13 (D)

1. (i) $2x$ (ii) 2 (iii) $2xy$ (iv) $3a$ (v) $6y$ (vi) $2x$ (vii) $-6y$ (viii) $5ac$ (ix) $7ab$ (x) $-35b$ (xi) $-5a$
 (xii) $2a + 1$ (xiii) $12x - \frac{y^2}{x}$ (xiv) $\frac{4}{3}m^2 - 2n^2$ (xv) $-6a + 5b$ (xvi) $-5x + 4y$ 2. (i) $-\frac{8}{3}b$ (ii) $-\frac{5x^2}{y}$
 (iii) $2x + 6$ (iv) $-4a + 1$ (v) $-m + 2$ (vi) $-\frac{5}{p} + 4$ (vii) $-4x^2 + 2x$ (viii) $-2a + 3b$ (ix) $3x^2 - 2xy + xy^2$
 (x) $-3a^2 + 5ab - 4b^2$ 3. (i) $n - 1$ (ii) $m - n$ (iii) $2a + 1$ (iv) $p + 2$ (v) $x + 2y$ (vi) $2a - 3$ (vii) $3x - 2$
 (viii) $4a + 12$ (ix) $3x - 4y$ (x) $3x + 2y$ (xi) $7a^2 + 2ab$ (xii) $2x^2 + 3x - 5$ 4. $3x - 5y$ 5. $5x + y; 20x + 8y$

Exercise 14 (A)

1. (i) $x^2 + 17x + 60$ (ii) $x^2 + 10x + 16$ (iii) $y^2 + 18y + 45$ (iv) $n^2 + 27n + 180$ (v) $x^2 + 0.9x + 0.2$
 (vi) $y^2 + 0.8y + 0.07$ (vii) $x^2 + x + \frac{2}{9}$ (viii) $y^2 + \frac{6}{5}y + \frac{8}{25}$ 2. (i) $x^2 + 3x - 4$ (ii) $x^2 + 7x - 120$
 (iii) $m^2 - 64$ (iv) $n^2 + 3n - 180$ (v) $x^2 + 0.3x - 0.4$ (vi) $y^2 + 0.6y - 0.07$ (vii) $x^2 + \frac{1}{2}x - \frac{3}{16}$
 (viii) $y^2 + \frac{2}{5}y - \frac{8}{25}$ 3. (i) $x^2 - 3x - 40$ (ii) $x^2 - 5x - 84$ (iii) $m^2 - 25$
 (iv) $x^2 - 15x - 54$ (v) $x^2 - 0.7x + 1.44$ (vi) $y^2 - 0.7y - 0.08$ (vii) $x^2 - \frac{1}{3}x - \frac{14}{225}$ (viii) $y^2 - \frac{1}{5}y - \frac{12}{25}$
 4. (i) $x^2 - 11x + 28$ (ii) $x^2 - 25x + 100$ (iii) $m^2 - 18m + 81$ (iv) $n^2 - 26n + 144$ (v) $x^2 - 2.1x + 0.98$
 (vi) $y^2 - 3y + 1.44$ (vii) $x^2 - x + \frac{20}{81}$ (viii) $y^2 - \frac{10}{13}y + \frac{21}{169}$ 5. (i) $x^2 + 24x + 135$ (ii) $x^2 + 6x - 135$
 (iii) $x^2 - 6x - 135$ (iv) $x^2 - 24x + 135$ (v) $y^2 + 1.2y + 0.32$ (vi) $y^2 + 0.4y - 0.32$ (vii) $y^2 - 0.4y - 0.32$
 (viii) $y^2 - 1.2y + 0.32$ (ix) $z^2 + \frac{z}{5} - \frac{2}{25}$ (x) $z^2 - \frac{3z}{5} + \frac{2}{25}$ (xi) $z^2 - \frac{z}{5} - \frac{2}{25}$

Exercise 14 (B)

1. (i) $a^2 + 4ab + 4b^2$ (ii) $9b^2 + 6bc + c^2$ (iii) $4a^2 - 20ab + 25b^2$ (iv) $9x^2 - 24x + 16$ (v) $x^2 - 2 + \frac{1}{x^2}$
 (vi) $a^2 + 2 + \frac{1}{a^2}$ (vii) $25p^2 - 10p + 1$ (viii) $16a^2b^2 + 8ab^2c + b^2c^2$ (ix) $a^2b^2 + 2abcd + c^2d^2$
 (x) $a^4 + 2a^2b^2 + b^4$ (xi) $x^4 + 4x^3 + 4x^2$ (xii) $a^2b^2c^2 + 2abc^2d + c^2d^2$ (xiii) $p^2x^2 - 2pqx + q^2$
 (xiv) $9a^4 + 24a^2b^2 + 16b^4$ 2. (i) $x^2 - 25$ (ii) $a^2 - 4$ (iii) $4x^2 - 1$ (iv) $9a^2 - 4b^2$ (v) $4a^2 - 25b^2$
 (vi) $16x^2y^2 - 9p^2q^2$ (vii) $0.04x^2 - 0.25y^2$ (viii) $\frac{1}{4}a^2 - \frac{1}{9}b^2$ (ix) $81a^2 - 169b^2$ (x) $m^2n^4 - m^4n^2$
 3. (i) No (ii) No (iii) Yes (iv) Yes (v) No (vi) No (vii) Yes (viii) No 4. (i) 11025 (ii) 2704
 (iii) 9409 (iv) 4896 (v) 9999 (vi) 1680 (vii) 415 (viii) 456 (ix) 15600 5. (i) $9x^2 + 12xy + 4y^2$
 (ii) $25a^2 - 60a + 36$ (iii) $4m^2 + 20mn + 25n^2$ (iv) $4x^2y^2 + 28xy + 49$ (v) $16 - 72mn + 81m^2n^2$
 (vi) $4x^2 - 8 + \frac{4}{x^2}$ (vii) $4x^2 - 49$ (viii) $9m^2 - 25n^2$ (ix) $n^2 - 0.36$ (x) $x^2 - \frac{9}{16}$ (xi) $\frac{25}{49}x^2 - 1$
 (xii) $y^2 - \frac{4}{9}z^2$ (xiii) 484 (xiv) 10609 (xv) 9604 (xvi) 40040 (xvii) 22491

Exercise 15 (A)

1. $\frac{3x}{4}$ 2. $\frac{a}{2}$ 3. $\frac{17y}{20}$ 4. $\frac{3x}{8}$ 5. $\frac{11y}{20}$ 6. $\frac{p}{15}$ 7. $\frac{37k}{30}$ 8. $\frac{11x}{20}$ 9. $\frac{a}{21}$ 10. $\frac{64b}{15}$ 11. $\frac{19k}{63}$
 12. $\frac{11a}{40}$ 13. $\frac{11x}{6}$ 14. $\frac{-y}{15}$ 15. $\frac{7x+5}{10}$ 16. $\frac{4x+2}{3}$ 17. $\frac{y-10}{10}$ 18. $\frac{13a-1}{6}$ 19. $\frac{11k-7}{12}$
 20. $\frac{13m+10}{15}$ 21. $\frac{475x-1186}{105}$ 22. $\frac{70p^3}{9}$ 23. $\frac{14p}{75}$ 24. $\frac{150}{343}$

Exercise 15 (B)

1. $x - (y + z)$ 2. $x^2 - (xy^2 + 2xy + y^2)$ 3. $4a - (9 - 2b + 6)$ 4. $x^2 - (y^2 - z^2 - 3x + 2y)$
 5. $-2a(a - 2b + 3ab^2 - 4b^2)$ 6. $x - 2y + z$ 7. $2p - q$ 8. $13x - 5$ 9. $14a + 9b$
 10. $p - 5q + r$ 11. $18ab - 27a^2 + 63ca$ 12. $10m^2 - 15mn + 35mp$ 13. $-x^2 - 2xy$ 14. 1
 15. $6a + 4b - 38c$ 16. $a^2 - b^2 - c^2 + 1$ 17. $8x^2 + 33xy$ 18. $a + b + c - d$ 19. $-1 - 7x$
 20. $a + 2b$ 21. $x + 3$ 22. $6b - 5a - 8$ 23. $4x - 6y$ 24. $3a - 3b + 6$ 25. $-104m + 72n - 176p$
 26. $p + 3q - 1$ 27. $-34a + 18$ 28. $-a$ 29. 11 30. $x^2 - y^2 + z^2 + 2xy - 2xz$ 31. $-a + 15b - 106$

Exercise 16 (A)

1. 5 2. 5 3. 8 4. 13 5. -7 6. 4 7. 2 8. 0 9. 18 10. 48 11. 5 12. 0
 13. 15 14. 13 15. 5 16. $\frac{5}{6}$ 17. 30 18. 14 19. 6.5 20. $3\frac{1}{4}$ 21. $-\frac{5}{8}$ 22. 0.06
 23. $14\frac{2}{3}$ 24. -5 25. 30 26. 32 27. 112 28. 4 29. 3 30. 3 31. $b = 11$ 32. 50 33. 144

Exercise 16 (B)

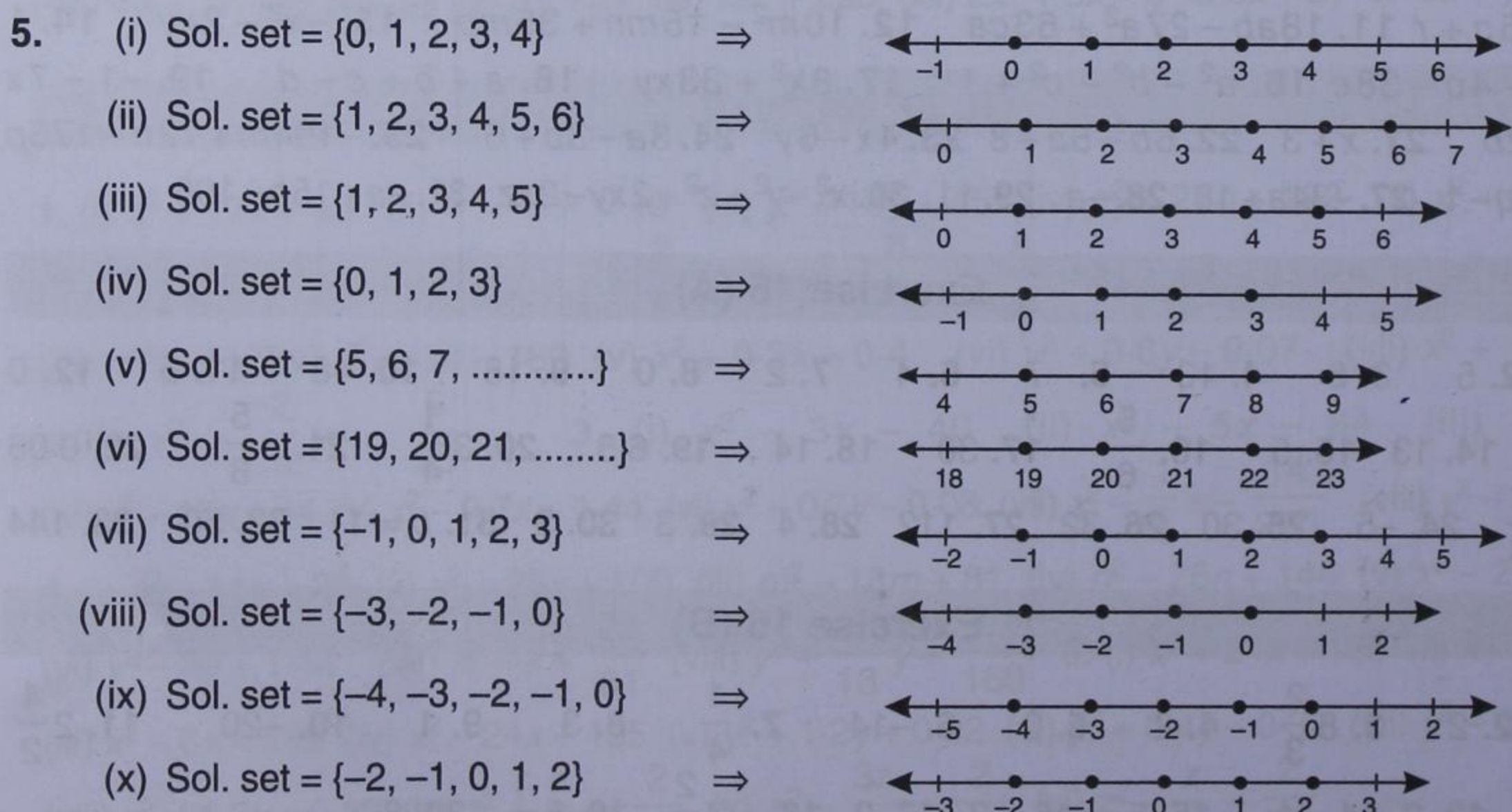
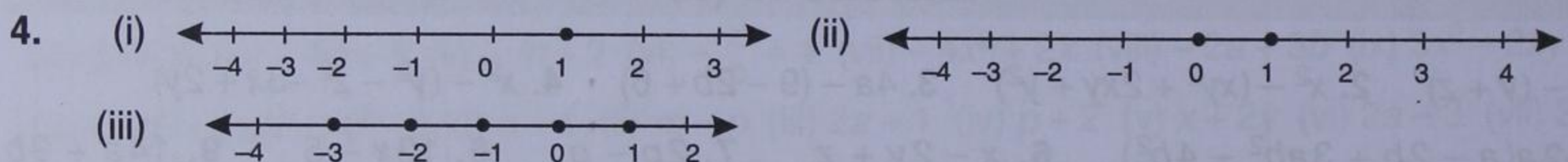
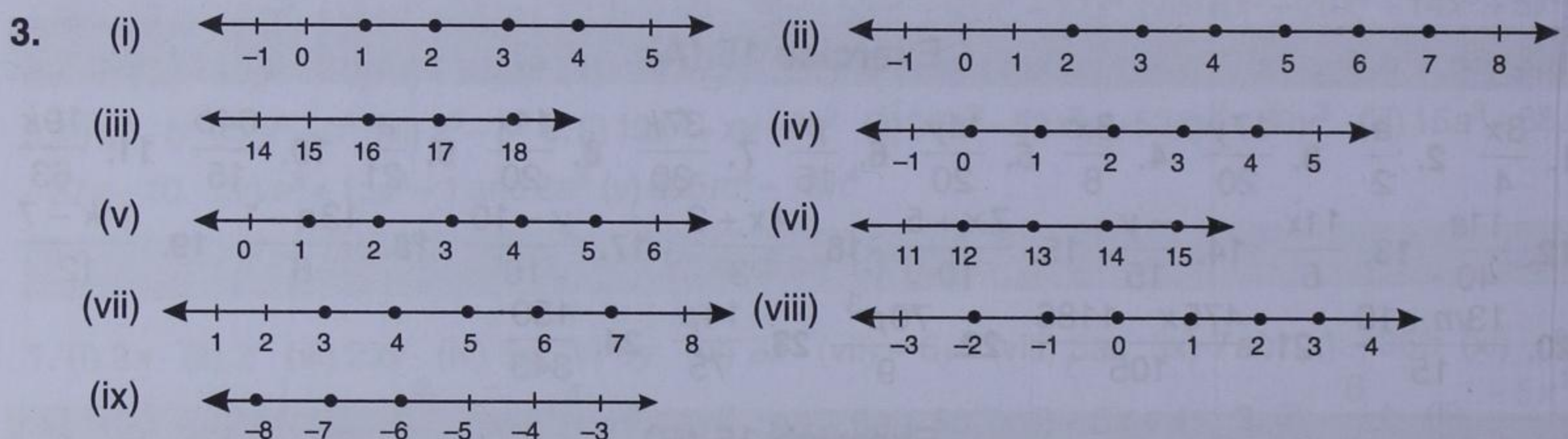
1. 5 2. 2 3. $8\frac{2}{3}$ 4. 2 5. 0 6. -14 7. $\frac{1}{4}$ 8. 3 9. 1 10. -20 11. $2\frac{1}{2}$
 12. 18 13. 2 14. -4 15. 5 16. -2 17. 2 18. $-2\frac{2}{5}$ 19. $5\frac{1}{2}$ 20. 8

Exercise 16 (C)

1. 6 2. 15 3. 8 4. 20 5. 24 6. 1 7. -1 8. 10 9. $2\frac{2}{5}$ 10. 72 11. 75 12. 20
 13. 20 14. 200 15. 15 16. 50 17. 6 18. 7 19. 10 20. 5 21. 11 22. $-4\frac{15}{41}$ 23. -2
 24. 2 25. $5\frac{1}{2}$ 26. 10 27. 6 28. -9 29. 6 30. $5\frac{1}{2}$

Exercise 16 (D)

1. (i) x is greater than -8 (ii) x is greater than 5 (iii) x is less than -4 (iv) x is less than 8
 (v) x is greater than or equal to 4 (vi) x is greater than or equal to -7 (vii) x is less than or equal to 10
 (viii) x is less than or equal to -15 2. (i) $x+7 > 2$ (ii) $x+15 < 23$ (iii) $-x+4 > 19$ (iv) $-x+8 < -2$
 (v) $x+10 \leq 3$ (vi) $x-4 \leq 14$ (vii) $-x-2 \leq 6$ (viii) $x+11 \geq 3$ (ix) $x-4 < -19$ (x) $x-8 \geq -4$
 (xi) $-x-3 \leq 2$ (xii) $5x > 15$ (xiii) $9x \geq -36$ (xiv) $2x \leq 4$ (xv) $2x > 3$ (xvi) $2x < 20$ (xvii) $\frac{x}{4} < -2$
 (xviii) $-\frac{x}{4} > 2$ (xix) $-x \geq 2$ (xx) $2x \leq -3$



Exercise 17 (A)

1. $D \text{ days} = 7 \times w \text{ weeks} + p \text{ days}$ i.e. $D = 7w + p$ 2. $3 \times \text{the number} - 12 = 24$ i.e. if the given number is x ; $3x - 12 = 24$ 3. $\frac{1}{3}$ of the number $+ \frac{1}{2}$ of the same number 10 i.e. if the given number is x ; $\frac{1}{3}x + \frac{1}{2}x = 10$ 4. $2 \times \text{the number} - 2 = 22$ i.e. if the given number is x ; $2x - 2 = 22$
5. $(\text{The given number} - 5) \div 15 = 3$ i.e. if the given number is x ; $(x - 5) \div 15 = 3$ or $\frac{x - 5}{15} = 3$
6. $(\text{The given number} \times 9) - 2 = 88$ i.e. if the given number is x ; $x \times 9 - 2 = 88 \Rightarrow 9x - 2 = 88$
7. If the smallest consecutive number is x ; then $x + (x + 1) + (x + 2) = 78$
8. If the smallest odd integer is x ; then $x + (x + 2) + (x + 4) = 57$ 9. $\text{₹ } 500 - \text{₹ } (10 + 75 + 5) = \text{₹ } x$
10. His earnings in the week = $\text{₹ } 3 \times 8 \times 6 + \text{₹ } 6 \times 10$ 11. $v = u + at$
12. $203 = 23 \times 1 + 12 \times (x - 1)$ 13. $x + 8 = 2(x - 5)$ 14. $5x + 6(x - 280)$

Exercise 17 (B)

1. $y = \frac{m - x}{2}$ 2. $s = \frac{v^2 - u^2}{2a}$ 3. $h = \frac{2A}{a + b}$ 4. $l = \frac{2s - na}{n}$ or, $l = \frac{2s}{n} - a$
5. $F = \frac{9}{5}C + 32$ 6. $C = \frac{5}{9}(F - 32)$ 7. $p = \frac{A}{a + rt}$ 8. $a = \frac{2(s - ut)}{t^2}$ 9. $d = \frac{2(s - an)}{n(n - 1)}$
10. $x = \frac{(a + 1)y}{1 - a}$ 11. $m = \frac{2bc + 3ad}{3d - 2c}$ 12. $y = \frac{x(5 + 2a)}{2(3a - 4)}$

Exercise 17 (C)

1. $F = 104$ 2. $h = \frac{105}{16} \text{ cm} = 6\frac{9}{16} \text{ cm}$ [Take: $\pi = \frac{22}{7}$] 3. $b = 6$ 4. $i = 2t^2, 288$
5. $r = \frac{p}{\pi + 2} : 7.78 \text{ (app.)}$ 6. $x = 1\frac{4}{5} = 1.8$ 7. $v = 7\frac{1}{2} = 7.5$ 8. (i) -16 (ii) -16 (iii) 64
9. $h = 18$ 10. (i) -10 (ii) 217

Exercise 18 (A)

1. 16 2. 4 3. 3 4. 15 5. 7 6. 7 7. 6 8. 60 9. 15, 16 and 17 10. 13 and 15 11. 12, 14 and 16 12. 60
13. 30 and 45 14. 10, 11 and 12 15. 731 and 89

Exercise 18 (B)

1. 10 yrs and 34 yrs 2. $x = 4$ 3. 3 yrs. 4. 3 yrs and 27 yrs. 5. $24m$ and $6m$ 6. $\text{₹ } 25$
7. $\text{₹ } 12$ 8. $\text{₹ } 40$ 9. $55 m$ and $40 m$ 10. John = $\text{₹ } 55$ and Smith = $\text{₹ } 5$ 11. (i) $\text{₹ } (x - 18)$
(ii) $\text{₹ } [5x + 8(x - 18)] = \text{₹ } (13x - 144)$. Equation is : $13x - 144 = 142$. Cost of 1 pen = $\text{₹ } 22$ and cost of 1 pencil = $\text{₹ } 4$ 12. 110° and 70° 13. Males = 210 and females = 350 14. 13 15. (i) 8 (ii) 77 cm

Exercise 19 (A)

1. $8(x + 3y)$ 2. $a(b - 2x)$ 3. $x(2y + 3z)$ 4. $6a(2a - 3b)$ 5. $3x(2 + 3x)$ 6. $3a(5a - 6)$
 7. $xy(2x - 5y)$ 8. $a^2(1 + 8b)$ 9. $a^2b^2(b - a)$ 10. $3x(3y - 7z)$ 11. $y(3y - z)$ 12. $5ab(2b + 3a)$
 13. $-3x^2(3x + 4)$ 14. $-4xy(2x - 3)$ 15. $bc(a - d)$ 16. $-55ab(a - 3b)$ or $= 55ab(3b - a)$
 17. $9x^3(3 - y)$ 18. $-6xy^2(1 + 4x)$ 19. $a(x - y + z)$ 20. $a(a^2 + a - 1)$ 21. $x(5x - 6y - z)$
 22. $5(3a - 4b + 6c)$ 23. $3x(2x + 1 - 4xy)$ 24. $-4(2 + 3m + 5m^2)$

Exercise 19 (B)

1. $(x + y)(x + 1)$ 2. $(a - b)(2a - c)$ 3. $(1 - 2x)(2x + 5a)$ 4. $(a - 3)(a^2 + 1)$ 5. $(p - q)(p + 5)$
 6. $(a + 2)(a^3 + 6)$ 7. $(a - 2)(b + a)$ 8. $(x - a)(x - b)$ 9. $(x + a)(ax + b)$ 10. $(x + 1)(x^2 + 1)$
 11. $(x - 1)(x^2 + 1)$ 12. $(a + 1)(a - 2)$ 13. $(x + 2)(x - 1)$ 14. $(p - q)(r + s)$ 15. $(a - b^2)(a^2 - b)$
 16. $(x - a)(x - b)$ 17. $(b - c)(a + d)$ 18. $(2 - x)(a - 2b)$ or $= (x - 2)(2b - a)$ 19. $(a + b)(x + y + z)$
 20. $(x - 1)(x^2 + a + 1)$

Exercise 19 (C)

1. $(x + 3)(x - 3)$ 2. $(1 + 2p)(1 - 2p)$ 3. $(2a + 3)(2a - 3)$ 4. $(4 + 7y)(4 - 7y)$ 5. $(2x + y)(2x - y)$
 6. $(x + 4m)(x - 4m)$ 7. $(7 + 11p)(7 - 11p)$ 8. $(a + 2xy)(a - 2xy)$ 9. $(a^2 + x)(a^2 - x)$
 10. $(mn^2 + 5a^2b)(mn^2 - 5a^2b)$ 11. $(x + 0.7)(x - 0.7)$ 12. $(4x + \frac{3}{5})(4x - \frac{3}{5})$
 13. $(3 + \frac{2x}{3})(3 - \frac{2x}{3})$ 14. $(0.8 + \frac{x}{8})(0.8 - \frac{x}{8})$ 15. $(m + 1\frac{1}{3})(m - 1\frac{1}{3})$
 16. $(\frac{3}{2}x + \frac{1}{3})(\frac{3}{2}x - \frac{1}{3})$ 17. $(\frac{a}{b} + \frac{b}{a})(\frac{a}{b} - \frac{b}{a})$ 18. (i) 1800 (ii) 34000 (iii) 355 (iv) 0.70 (v) 0.90

Exercise 19 (D)

1. $5(x + 1)(x - 1)$ 2. $2(3 + 5x)(3 - 5x)$ 3. $y^2(x + 1)(x - 1)$ 4. $a(a + 1)(a - 1)$ 5. $a^2(a + 2)(a - 2)$
 6. $(a^2 + 1)(a + 1)(a - 1)$ 7. $2x(x + 2)(x - 2)$ 8. $3(1 + 2ab)(1 - 2ab)$ 9. $11(2x + 3y)(2x - 3y)$
 10. $16(1 + x)(1 - x)$ 11. $4(x + 5y)(x - 5y)$ 12. $5(m + 5n)(m - 5n)$ 13. $(a^2 + b^2)(a + b)(a - b)$
 14. $(a^2 + 4b^2)(a + 2b)(a - 2b)$ 15. $(a^2 + 4)(a + 2)(a - 2)$ 16. $9(1 + 2ax)(1 - 2ax)$
 17. $7(m + 2)(m - 2)$ 18. $6(2 + pa)(2 - pa)$ 19. $(a^2 + \frac{1}{a^2})(a + \frac{1}{a})(a - \frac{1}{a})$
 20. $(1 + \frac{1}{a^2})(1 + \frac{1}{a})(1 - \frac{1}{a})$ 21. $(\frac{a^2}{b^2} + \frac{b^2}{a^2})(\frac{a}{b} + \frac{b}{a})(\frac{a}{b} - \frac{b}{a})$ 22. $3(x + 2y)(1 + m)$
 23. $2(a - b)(a - 2)$ 24. $5(a - 3)(a^2 + 1)$ 25. $5(a - 2)(a^3 - 4)$ 26. $(5a + 3b)(3a + 5b)$
 27. $3(7a + 9b)(a + 7b)$ 28. $(18a - 23b)(10a - 47b)$ 29. $4(4x + y)(x + 4y)$

Exercise 20 (A)

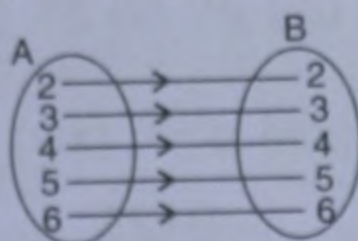
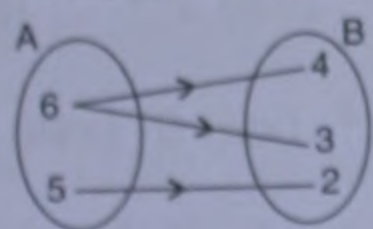
2. (i) First (ii) Third (iii) Second (iv) Fourth (v) Fourth (vi) Third (vi) Second (vii) First
 3. (i), (iii) and (vi) points lie on X-axis, because their ordinates are zero each.
 4. $A(0, 0)$; $B(2, 1)$; $C(-6, -3)$; $D(-4, 0)$; $E(0, 6)$; $F(0, -2)$; $G(6, 5)$; $H(7, -4)$; $I(-2, 2)$; $J(3, -3)$; $K(10, 0)$; $L(-11, 1)$; $M(8, 3)$; $N(-9, 4)$ 5. (ii), (iv) and (v) lie on Y-axis, because their abscissae are zero each 6. (i) First (ii) Fourth (iii) Third (iv) Second (v) X-axis (vi) Y-axis (vii) ordinate (viii) abscissa

Exercise 20 (B)

1. (i) All these points lie on the x-axis. (ii) y-co-ordinate of all the points is zero.
 2. (i) All these points lie on the y-axis. (ii) x-co-ordinate of all these points is zero.
 5. (i) $A = (5, 0)$ (ii) $B = (0, 10)$ 6. $(12, 0)$ and $(0, -4)$ 7. $A = (-10, 0)$, $B = (0, -2)$ and area of $\triangle AOB = 10$ sq. units 10. $P = (4, 5)$

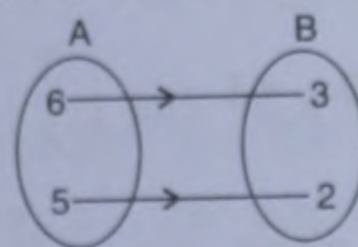
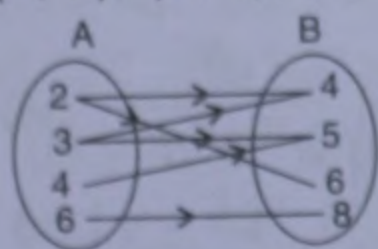
Exercise 21 (A)

1. (i) True (ii) True (iii) False (iv) False (v) True (vi) False (vii) True (viii) True (ix) False (x) True 2. (i) $x = 4$ and $y = 1$ (ii) $a = 1$ and $b = 2$ (iii) $m = 7$ and $n = 5$ (iv) $x = 2$ and $y = 2$
 3. (i), (iii) and (iv) are relations from P to Q. (i) Domain $\{2, 4, 6\}$; Range $\{9, 10\}$
 (iii) Domain $\{2\}$; Range $\{10\}$ (iv) Domain $\{4, 6, 8\}$; $\{9, 10\}$ 4. (ii) and (iii), (ii) Domain = $\{1\}$, Range = $\{a, b, c\}$ (iii) Domain = $\{1, 2, 5\}$, Range = $\{a, b, c\}$
 5. (i) $\{(6, 4), (6, 3), (5, 2)\}$ (ii) $\{(5, 5), (2, 2), (6, 6), (3, 3), (4, 4)\}$

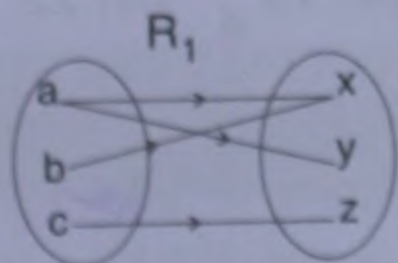


(iii) $\{(4, 5), (3, 5), (2, 4), (6, 8), (2, 6), (3, 4)\}$

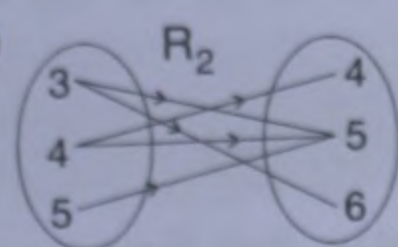
(iv) $\{(6, 3), (5, 2)\}$



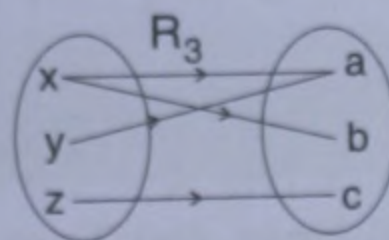
6. (i)



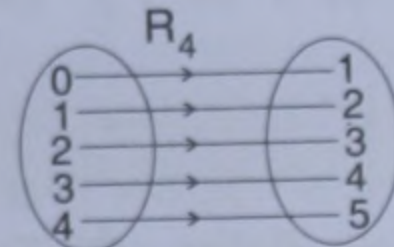
(ii)



(iii)

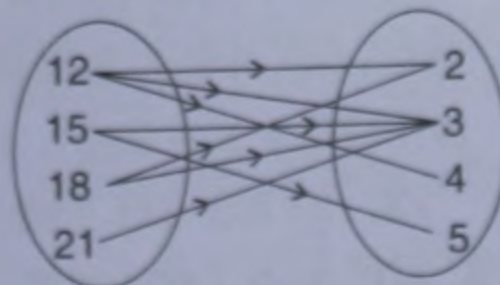


(iv)



7. (i) $R = \{(1, 3), (2, 3), (2, 8), (5, 4), (5, 6)\}$ (ii) $R = \{(a, p), (a, q), (a, r), (c, p), (d, q), (d, r)\}$
 8. (i) $R = \{(1, 1), (2, 2), (3, 3)\}$, Domain = $\{1, 2, 3\}$ and range = $\{1, 2, 3\}$
 (ii) $R = \{(2, 1), (3, 1), (3, 2), (4, 1), (4, 2), (4, 3)\}$, Domain = $\{2, 3, 4\}$ and range = $\{1, 2, 3\}$
 (iii) $R = \{(1, 2), (1, 3), (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)\}$, Domain = $\{1, 2, 3, 4\}$ and range = $\{2, 3, 5\}$ (iv) $R = \{(2, 1), (3, 2), (4, 3)\}$, Domain = $\{2, 3, 4\}$ and range = $\{1, 2, 3\}$
 9. $R = \{(3, 6), (3, 9), (4, 8), (5, 10), (6, 6)\}$ 10. (i) Arrow diagram :

Arrow diagram is :



(ii) $R = \{(12, 2), (12, 3), (12, 4), (15, 3), (15, 5), (18, 2), (18, 3), (21, 3)\}$

11. Domain = $\{2, 3, 5\}$; Range = $\left\{\frac{1}{2}, \frac{1}{3}, \frac{1}{5}\right\}$; Roaster form $R = \left\{\left(2, \frac{1}{2}\right), \left(3, \frac{1}{3}\right), \left(5, \frac{1}{5}\right)\right\}$

Exercise 21 (B)

- (i) R_1 is not a mapping. **Reason** : Ordered pairs (a, p) and (a, s) have same first component.
(ii) R_2 is a mapping. **Reason** : Every element of B is associated with unique element in A.
- This is not a mapping since element 3 of set A is not associated with any element of set B. Also, ordered pairs $(1, 6)$ and $(1, 4)$ have same first component.
- (i), (iii), (iv), (v) and (vi)
- (i) It is a mapping. Each element in A is associated with unique element in B.
(ii) It is not a mapping. Element 5 in A is associated with two elements in B.
(iii) It is a mapping. Each element in A is associated with unique element in B.
(iv) It is not a mapping. Element 7 in A is associated with two elements in B. Also, element 5 in A is not associated with any element in A.
- $\{(1, 3), (2, 3), (3, 5), (4, 7)\}$; It is a mapping, since every element of first set is associated with a unique element of 2nd set and no two ordered pairs have same first component.
- "is square of". Yes, it is mapping. Reason is same as given in previous question.

Exercise 22

- (i) 5 and 2 (ii) $(2y)^{3x}$ 2. (i) 2^5 (ii) $\frac{1}{2^5} = 2^{-5}$ (iii) 1 (iv) 1 (v) 8^2 (vi) 5^2 (vii) 5^6 (viii) 4 (ix) 1
- (i) $10b^{13}$ (ii) $54x^{10}y^8$ (iii) $-a^7$ (iv) y^5 (v) 3^5 (vi) $20x^3$ (vii) $10a^6b^4$ (viii) x^{4a-1} (ix) 3^{y-2}
(x) 2^{6a} (xi) $\frac{4}{9xy}$ (xii) 10^6x^{96} (xiii) a^{100} (xiv) $-n^{10}$ (xv) $-225a^6b^4c^8$ (xvi) 0 (xvii) $256a^{16}$
(xviii) $\frac{64}{27}$ (xix) $\frac{9}{2x}$ (xx) $\frac{a^6c^6}{81}$ (xxi) $\frac{3125}{32x^{17}}$ (xxii) $\frac{16qr^5}{p^5}$
- (i) $-2^2 \times 3^2$ (ii) $2^9 \times 5^2$ (iii) $\left(\frac{3}{2}\right)^2$ (iv) $-\left(\frac{2}{3}\right)^7 = \left(-\frac{2}{3}\right)^7$ (v) $\frac{c^8}{a^{10}b^2d^4}$ (vi) $\frac{b^{10}}{a^6}$
- (i) 4 (ii) $1\frac{1}{5}$ (iii) 1468 (iv) $-7\frac{1}{4}$ (v) 13 (vi) 5 6. (i) 16 (ii) $4\frac{1}{4}$ (iii) $15\frac{1}{4}$ (iv) 22

Exercise 23 (A)

- (i) False (ii) True (iii) True (iv) True (v) False (vi) False
- (i) No; since $\angle AOB$ and $\angle AOC$ are not on opposite sides of the common arm OB.
(ii) No; since $\angle AOB$ and $\angle AOC$ are not on opposite sides of the common arm OC.
(iii) Yes; since $\angle AOB$ and $\angle AOC$ are on opposite sides of the common arm OA.
(iv) No; since $\angle AOB$ and $\angle AOC$ are not on opposite sides of the common arm OB.
- (i) 35° (ii) 60° (iii) 120° 4. 30° 5. 90° 6. $p^\circ = q^\circ = r^\circ = 60^\circ$ 7. $x = 120^\circ$ and $y = 60^\circ$
- $b = 90^\circ$ 9. (i) 8° (ii) 82° 10. (i) 65° (ii) 0° (iii) $(90 - a)^\circ$ (iv) $(85 - x)^\circ$ (v) $(60 + a)^\circ$
(vi) 45° (vii) 30° (viii) $68^\circ 43'$ 11. (i) 80° (ii) 180° (iii) $(180 - x)^\circ$ (iv) $(145 - x)^\circ$
(v) $(90 - a - b)^\circ$ (vi) $(70 + x + 2y)^\circ$ (vii) 162° (viii) $99^\circ 10' 35''$ 12. (i) Yes (ii) No
(iii) Yes (iv) Yes 13. (i) No (ii) Yes (iii) No (iv) Yes 14. $(27.4)^\circ = 27^\circ 24'$
- 15° and 75° 16. 40° and 140° 17. 30° , 45° and 105° 18. 600° 19. 100°
- $x = 18^\circ$ and its supplement = 162° 21. (i) $(52.5)^\circ = 52^\circ 30'$ (ii) 53° 22. 60° and 30°
- 60° and 12° 24. 72° , 72° , 90° and 126° 25. (i) 45° (ii) 5°

Exercise 23 (B)

- (i) Interior alternate angles (ii) Adjacent angles (iii) Corresponding angles
(iv) Exterior alternate angles (v) Cointerior (allied) angles (vi) Exterior alternate angles
(vii) Corresponding angles (viii) Vertically opposite angles (ix) Adjacent angles
- (i) Vertically opposite angles (ii) Interior alternate angles (iii) Vertically opposite angles
(iv) Corresponding angles (v) Vertically opposite angles (vi) Cointerior angles
(vii) Vertically opposite angles (viii) Adjacent angles (ix) Cointerior angles
(x) Adjacent angles (xi) Cointerior angles
- (i) $\angle a = \angle b = \angle c$ (ii) $x = y = l = n = r$ and $k = m = q$ 4. $a = 110^\circ$, $b = 70^\circ$; $c = 70^\circ$,
 $d = 110^\circ$, $e = 70^\circ$, $f = 110^\circ$, $g = 70^\circ$ 5. (ii), (iv) and in (v) l_2 and l_4 6. (i) $a = 60^\circ$;
 $b = 60^\circ$ and $c = 60^\circ$ (ii) $x = 125^\circ = z$ and $y = 55^\circ$ (iii) $a = 60^\circ$; $b = 60^\circ$ and $c = 120^\circ$
(iv) $x = 50^\circ$; $y = 60^\circ$ and $z = 250^\circ$ (v) $k = 60^\circ$; $x = 90^\circ$; $y = 120^\circ$ and $z = 60^\circ$
(vi) $x = 110^\circ$; $s = 70^\circ$; $y = 70^\circ$; $p = 60^\circ$; $q = 120^\circ$; $r = 120^\circ$ and $t = 120^\circ$
(vii) $y = 110^\circ$; $z = 70^\circ$; $x = 60^\circ$; $p = 60^\circ$ and $q = 120^\circ$ (viii) $y = 75^\circ$; $z = 37^\circ$ and $x = 68^\circ$
(ix) $a = 65^\circ$; $b = 55^\circ$ and $c = 60^\circ$; (x) $z = 110^\circ$; $x = 70^\circ$ and $y = 110^\circ$
(xi) $x = 70^\circ$ and $y = 290^\circ$ (xii) $a = 270^\circ$ and $b = 90^\circ$
- (i) $x = 50^\circ$; $y = 40^\circ$; $z = 50^\circ$ and $p = 130^\circ$ (ii) $x = 45^\circ$; $y = 110^\circ$ and $p = 45^\circ$
- (i) $x = 60^\circ$ (ii) $x = 20^\circ$ (iii) $x = 36^\circ$ (iv) $x = 24^\circ$ (v) $x = 27^\circ$ (vi) $x = 13^\circ$

Exercise 24 (A)

- (i) Yes (ii) No (iii) No (iv) Yes 2. 60° each 3. $C = 60^\circ$ 4. 60° 5. (i) 60° (ii) 80°
(iii) 50° 6. (i) $x^\circ = 18^\circ$; $\angle A = 90^\circ$; $\angle B = 72^\circ$ and $\angle C = 18^\circ$ (ii) $\angle A = 36^\circ$; $\angle B = 72^\circ = \angle C$
- (i) $b = 65^\circ$ (ii) $x = 45^\circ$ (iii) $k = 60^\circ$ (iv) $m = 60^\circ$ 8. (i) $\angle a = 110^\circ$ (ii) $\angle c = 45^\circ$ (iii) $\angle b = 60^\circ$
- 48° , 60° and 72° 10. 50° and 70° 11. 63° and 56°
- (i) $x = 80^\circ$ (ii) $y = 60^\circ$ (iii) $k = 87^\circ$ (iv) $a = 62^\circ$ (v) $a = 85^\circ$; $b = 55^\circ$ and $c = 40^\circ$
(vi) $x = 68^\circ$ and $y = 49^\circ$ (vii) $a = 60^\circ$ (viii) $m = 20^\circ$ (ix) $a = 75^\circ$ and $b = 52.5^\circ = 52^\circ 30'$

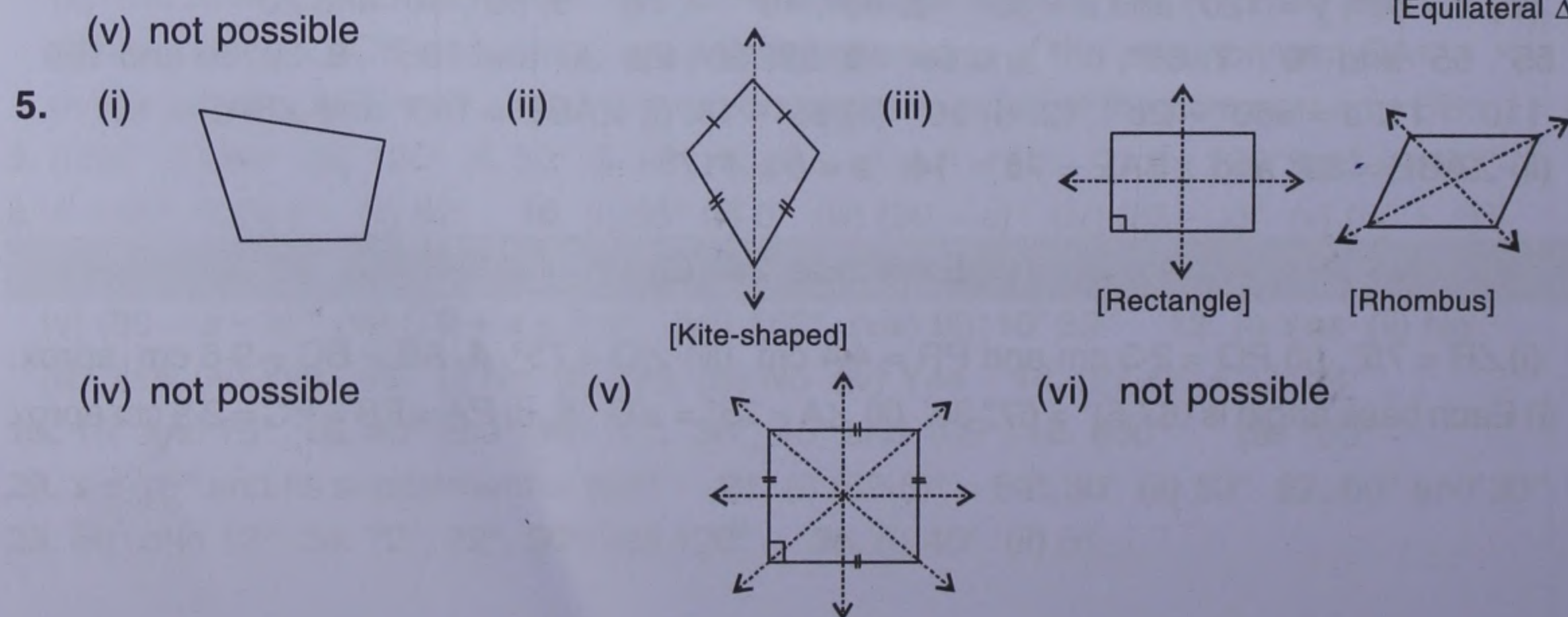
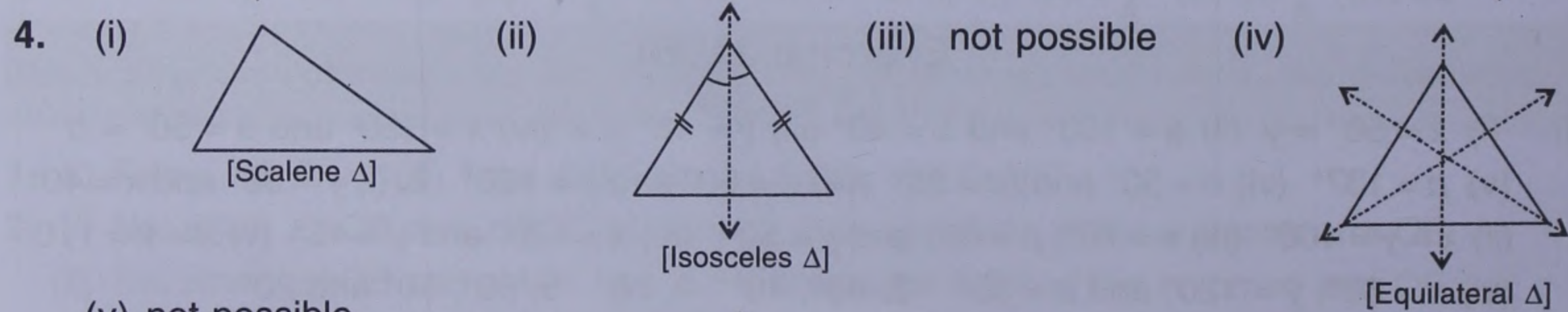
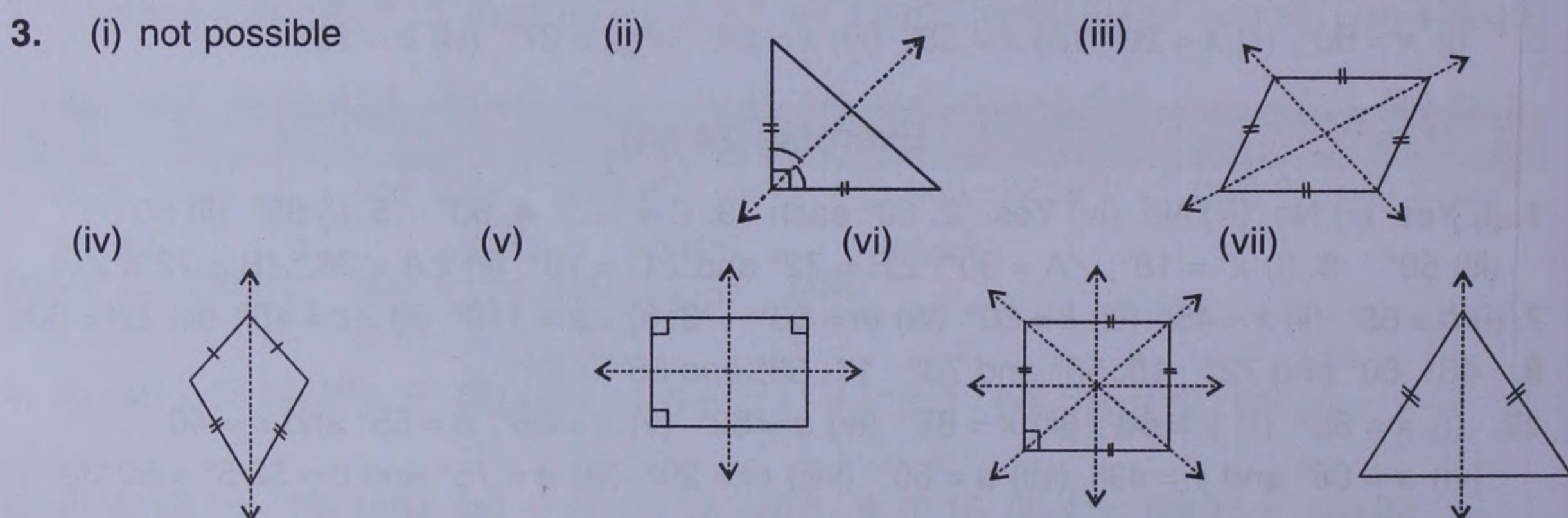
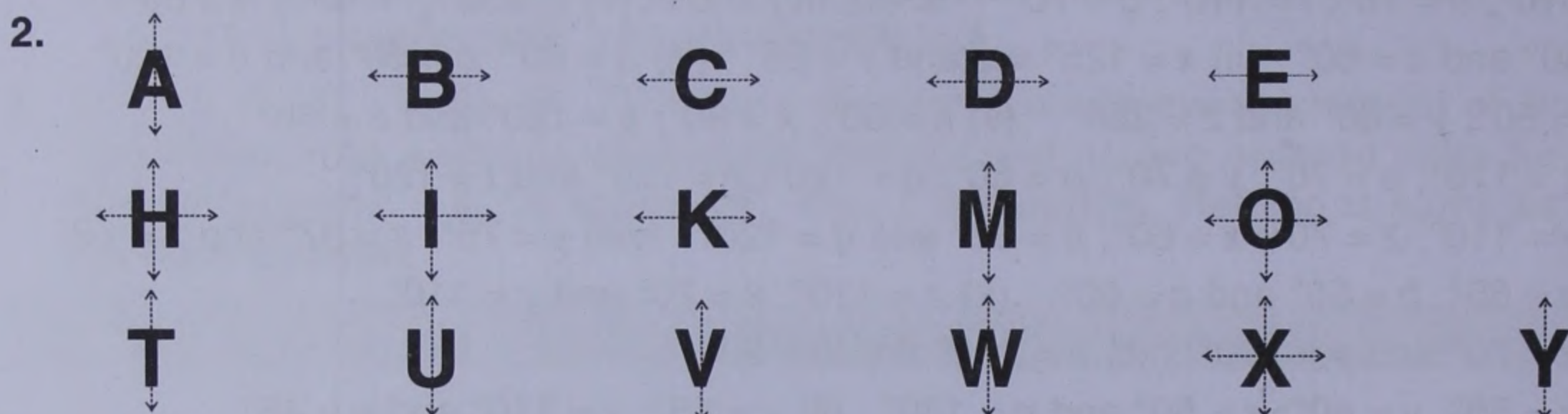
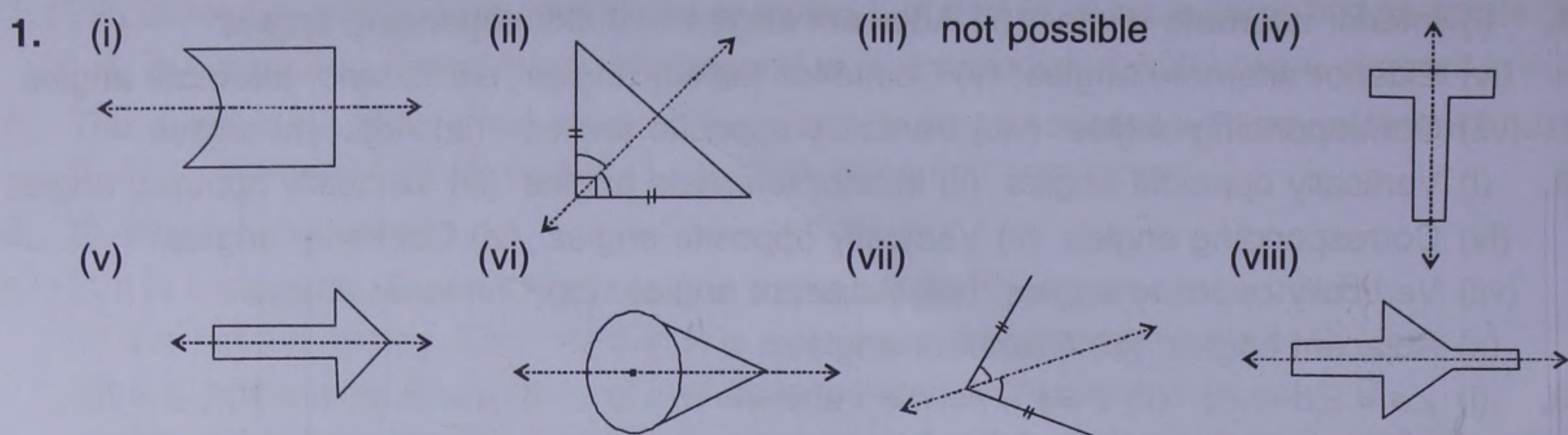
Exercise 24 (B)

- (i) $x = 50^\circ = y$ (ii) $a = 100^\circ$ and $b = 40^\circ$ (iii) $y = 45^\circ = x$ (iv) $x = 130^\circ$ and $a = 50^\circ = b$
(v) $p = 137^\circ$ (vi) $n = 50^\circ$ and $m = 35^\circ$ (vii) $x = 60^\circ$ and $y = 120^\circ$ 2. (i) $y = 35^\circ$ and $x = 40^\circ$
(ii) $x = y = 100^\circ$ (iii) $x = 70^\circ$; $p = 60^\circ$ and $y = 50^\circ$ (iv) $x = 120^\circ$ and $y = 45^\circ$ (v) $x = y = 110^\circ$
(vi) $x = 60^\circ$; $y = 120^\circ$ and $z = 35^\circ$ 3. 40° , 40° 4. 76° 5. 80° , 80° and 20°
- 55° , 55° and 70° 7. 65° , 65° and 50° 8. $22^\circ 30'$, $22^\circ 30'$ and 135° 9. 30, 30 and 120
- 110° 11. $a = 360^\circ - 2b$ 12. (i) 30° (ii) 55° 13. (i) $\angle ABE = 150^\circ$ and $\angle BAE = 15^\circ$
(ii) $\angle ABE = 30^\circ$ and $\angle BAE = 75^\circ$ 14. $a = b = 117^\circ$

Exercise 24 (C)

- (i) $\angle R = 75^\circ$ (ii) $PQ = 2.3$ cm and $PR = 4.4$ cm (iii) $\angle Q = 75^\circ$ 4. $AB = BC = 9.6$ cm aprox.
- (i) Each base angle is $(67.5)^\circ = 67^\circ 30'$ (ii) $\angle A = 75^\circ = \angle C$ 6. (i) $PA = PB = PC = 2.9$ cm aprox

Exercise 25 (A)



6. Since, the triangle is equilateral; it will have three lines of symmetry.
7. $AB = AC \Rightarrow$ the triangle ABC is isosceles and so it has only one line of symmetry.
8. $PQ = QR \Rightarrow \Delta$ is isosceles and it has only one line of symmetry.
9. The required figure is a rhombus or a rectangle.
10. $AB = AD$ and $CB = CD$

Exercise 25 (B)

3. (i) $(8, -2), (-8, 2)$ and $(-8, -2)$ (ii) $(5, -6), (-5, 6)$ and $(-5, -6)$
 (iii) $(4, 5), (-4, -5)$ and $(-4, 5)$ (iv) $(6, 2), (-6, -2)$ and $(-6, 2)$
 (v) $(-3, -7), (3, 7)$ and $(3, -7)$ (vi) $(-4, -5), (4, 5)$ and $(4, -5)$
 (vii) $(-2, 7), (2, -7)$ and $(2, 7)$ (viii) $(-6, 3), (6, -3)$ and $(6, 3)$
 (ix) $(4, 0), (-4, 0)$ and $(-4, 0)$ (x) $(-7, 0), (7, 0)$ and $(7, 0)$
 (xi) $(0, 6), (0, -6)$ and $(0, 6)$ (xii) $(0, -8), (0, 8)$ and $(0, -8)$
 (xiii) $(0, 0), (0, 0)$ and $(0, 0)$
4. (i) $P' = (7, -3)$ and $P'' = (-7, -3)$ (ii) $(-7, -3)$ 5. (i) $B = (5, 4)$ (ii) $C = (-5, -4)$
 (iii) $(-5, -4)$ 6. (i) $Q = (-3, 8)$ (ii) $R = (-3, -8)$ (iii) $(-3, -8)$
7. $A' = (3, 0), B' = (7, 0), C' = (-8, 0), D' = (-7, 0)$ and $E' = (0, 0)$
8. $A' = (0, 4), B' = (0, 10), C' = (0, -4), D' = (0, -6)$ and $E' = (0, 0)$
9. $A' = (0, -7), B' = (-8, 0), C' = (0, 5), D' = (7, 0)$ and $E' = (0, 0)$
10. $A' = (4, -5)$, and $B' = (-5, -4)$. Yes : $AB = A'B'$
11. $A' = (-6, 4)$, and $B' = (-4, -6)$
12. $A' = (6, -5)$, and $B' = (4, 6)$. Yes : $AB = A'B'$

Exercise 26

1. (i) No (ii) Yes (by S.A.S.) (iii) No (iv) Yes (by S.S.S.) (v) Yes (by R.H.S.)
 (vi) Yes (by A.A.S. or A.S.A.) (vii) No 14. $x = 45^\circ$ and $y = 45^\circ$

Exercise 27 (A)

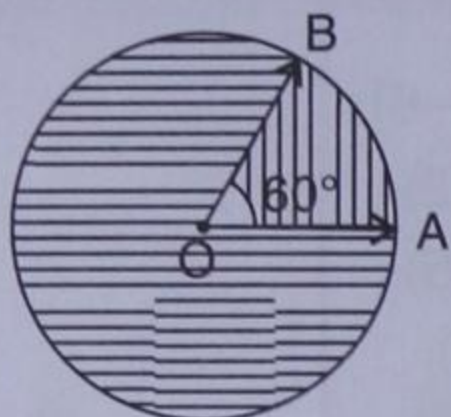
1. (a) 900° (b) 1440° (c) 1620° (d) 2340° (e) 2880° 2. (a) 7 (b) 26 (c) 16 (d) 20 (e) 24
3. (a) Yes (b) No (c) No

Exercise 27 (B)

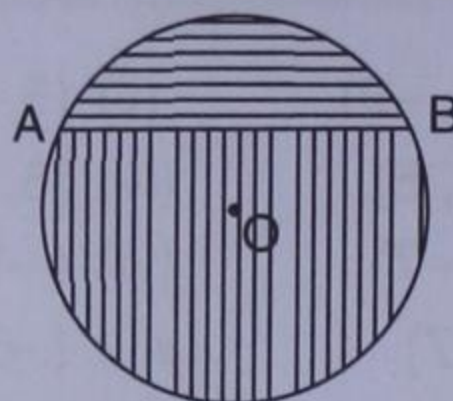
1. (a) Four (b) Four (c) Two (d) Four 2. (a) AB and AD (b) AB and DC (c) Four
 (d) Two (e) $\angle A$ and $\angle D$ (f) $\angle A$ and $\angle C$ (g) Four (h) Two 3. (a) True (b) True
 (c) False (d) True (e) True 4. (a) Rhombus (b) Rectangle (c) Square
5. Trapezium; since one pair of opposite sides BC and DE is parallel 6. 120°
7. A trapezium has only one pair of opposite sides parallel, whereas a parallelogram has both the pairs of opposite sides parallel. 8. 115° 9. 70° 10. 90°
11. $36^\circ, 72^\circ, 108^\circ$ and 144° 12. 180° 13. 145° 14. $\angle D = \angle C = 140^\circ$ 15. $110^\circ, 70^\circ$ and 110°
16. 90° 17. $72^\circ, 108^\circ, 72^\circ$ and 108° 19. (a) Diagonals of a parallelogram bisect each other
 (b) alternate angles (c) vertically opposite angles (d) by A.S.A.; Yes, XY is bisected by O.
20. (a) True (b) True (c) False (d) False (e) True (f) False (g) True

Exercise 30

1. Circle with centre at O and radius = 5 cm. 3. Yes 4. True
 5. $\text{radius} = \frac{\text{diameter}}{2}$ or $\text{diameter} = 2 \times \text{radius}$ 6. 4.2 cm 7. 16.8 cm
 8. No (diameter is the largest chord of a circle) 9. Yes 10. 10 cm ; diameter
 14. (ii) 90° 17. (i) outside the circle (i) inside the circle (iii) on the circumference of the circle
 19.



20.



Exercise 31 (A)

1. (i) 300 m^2 ; 70 m (ii) 250 m^2 ; 205 m (iii) 0.12 m^2 ; 2.6 m (iv) 0.91 m^2 ; 4 m
 2. (i) 625 m^2 (ii) 400 m^2 (iii) 2560000 m^2 3. (i) 8.4 m; 4.41 m^2 (ii) 20 m; 25 m^2
 (iii) 16.8 cm; 17.64 cm^2 (iv) 100 cm; 625 cm^2 4. (i) 17 m; 68 m (ii) 0.2 m; 0.8 m
 (iii) 2.4 m; 9.6 m (iv) 0.013 m; 0.052 m (v) 15 m; 60 m 5. 2000 m; 8000 m 6. 3.6 hectares
 7. (i) 7 m; 70 m^2 (ii) 1.5 m; 5.40 m^2 8. (i) 4 m; 28 m (ii) 12.5 cm; 57 cm (iii) 10 m; 52 m
 9. (i) 38 cm^2 ; 36 cm (ii) 50 cm^2 ; 30 cm (iii) 480 cm^2 ; 120 cm 10. ₹ 1,280
 11. (i) 1042 cm^2 and 158 cm^2 (ii) 1850 cm^2 and 550 cm^2 12. (i) 32 m (ii) 128 m
 (iii) 8 min 32 sec 13. (i) 700 m (ii) ₹ 35,000 (iii) 30000 m^2 and ₹ 2,40,000
 14. (i) 18 m and 16 m (ii) 288 m^2 and ₹ 43,200 15. (i) 400 m (ii) 100 m; $10,000 \text{ m}^2$
 16. (i) 104 cm^2 (ii) 336 cm^2 (iii) 960 cm^2

Exercise 31 (B)

1. (i) 189 cm^2 (ii) $3000 \text{ cm}^2 = 0.3 \text{ m}^2$ (iii) $0.56 \text{ m}^2 = 5600 \text{ cm}^2$
 2. (i) 16 cm (ii) 12 m (iii) 2.5 m (iv) 200 m
 3. (i) 6 cm^2 (ii) 48 cm^2 (iii) 315 cm^2 (iv) 2.2 cm^2 (v) 121.5 cm^2 (vi) 395 cm^2
 4. (i) 6 cm and 9 cm (ii) 24 m and 30 m (iii) 24 m and 18 m
 5. 18 cm; (i) 108 cm^2 (ii) No change 6. 36 m; (i) 13.5 m (iii) 75 m
 7. (i) 576 cm^2 (ii) 288 cm^2 (iii) 288 cm^2 (iv) 2 : 1, i.e. area of square ABCD is twice the area of triangle ABE.

Exercise 32

1. (i) 52 m^2 and 24 m^3 (ii) 2600 cm^2 and 7500 cm^3 (iii) 29.44 m^2 and 7.68 m^3
 2. (i) 150 m^2 and 125 m^3 (ii) 3456 cm^2 and $13,824 \text{ cm}^3$ (iii) 8.64 m^2 and 1.728 m^3
 3. 2.4 m 4. 1.89 m 5. 4000 6. 25 m^2 7. 34.2 m^2 8. 1550 cm^2
 9. 6 cm; 144 cm^2 10. 4 cm; 64 cm^3 11. 34 m^2 12. (i) ₹ 4,200 (ii) ₹ 960
 13. (i) 48 m^2 (ii) 43.25 m^2 (iii) ₹ 1,730 (iv) ₹ 285 14. ₹ 4,608 15. (i) 51.84 m^3 (ii) 576
 16. (i) 1440 cm^2 (ii) 3456 cm^3 17. (i) $30,000 \text{ cm}^3$ (ii) 240 (iii) $36,000 \text{ cm}^2$
 18. (i) 9 m^3 (ii) 9.6 m^2 (iii) 24.6 m^2

Exercise 33 (A)

1. (a) 2, 5, 6, 9, 13, 19, 25, 26, 32 and 42
(b) 2, 2, 2, 3, 3, 3, 4, 4, 4, 6, 6, 10, 10, 10, 11, 11, 12, 15, 15 and 30

2

No. of Children	No. of Families
0	2
1	6
2	6
3	5
4	4
5	2
	25

3.

No. of Children	Tally Marks	Frequency
30	I	1
35	III	3
36	I	1
37	IIII	4
38	IIII	4
39	II	2
40	IIII II	7
41	IIII	5
42	III	3
43	—	0
44	I	1
		31

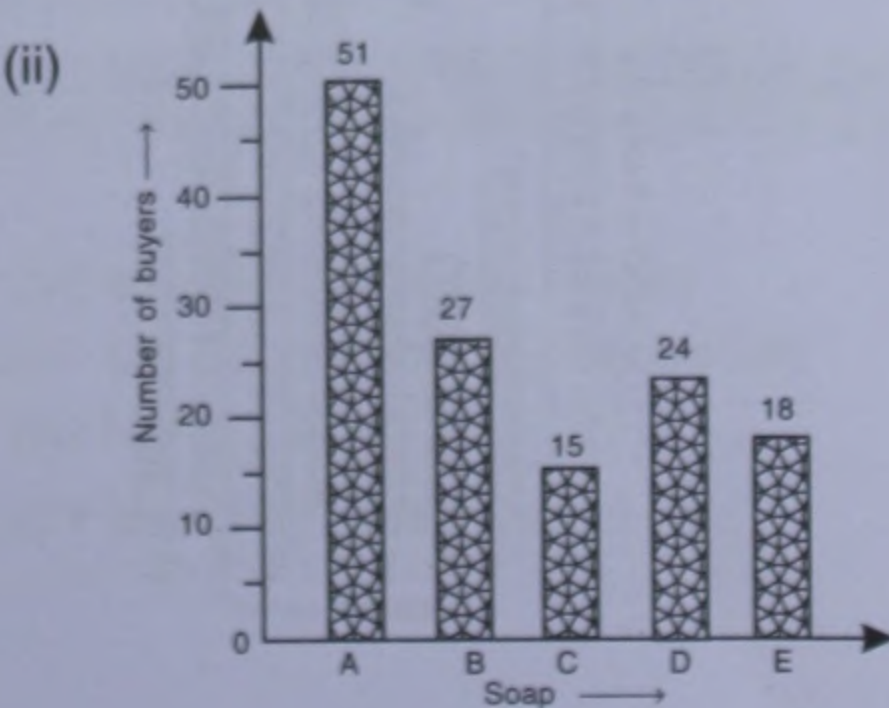
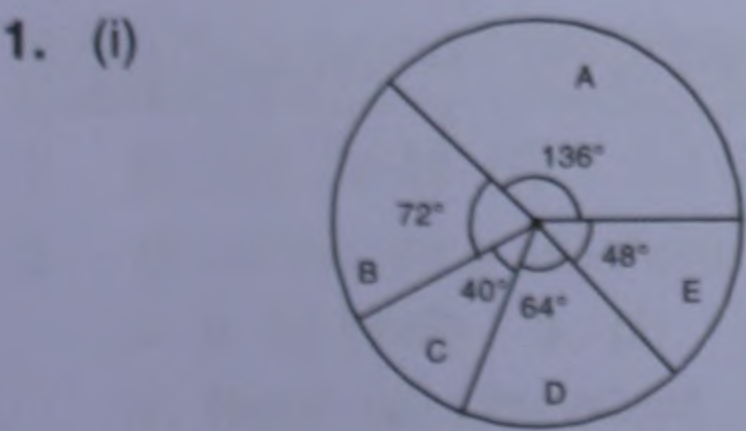
4.

Marks	Tally Marks	Frequency
0 – 4	II	2
5 – 9	I	1
10 – 14	IIII	5
15 – 19	IIII	5
20 – 24	IIII I	6
25 – 29	IIII I	6
30 – 34	IIII I	6
35 – 39	IIII IIII III	13
40 – 44	II	2
45 – 49	IIII	4
		50

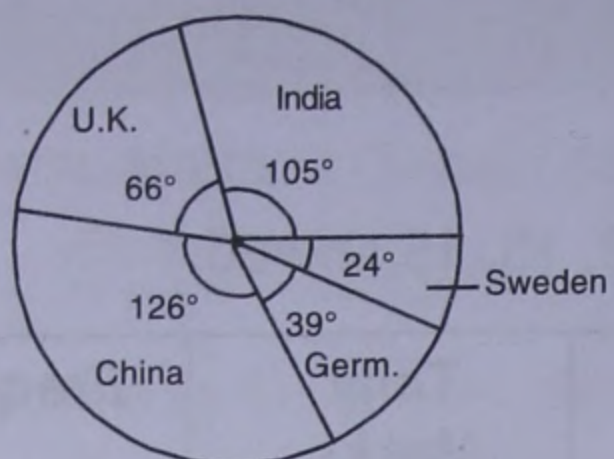
5.

Weight in gm	Tally Marks	Frequency
30 – 39	IIII	4
40 – 49	IIII I	6
50 – 59	III	3
60 – 69	IIII	4
70 – 79	IIII IIII	10
80 – 89	IIII I	6
90 – 99	II	2
100 – 109	III	3
109 – 119	II	2
		40

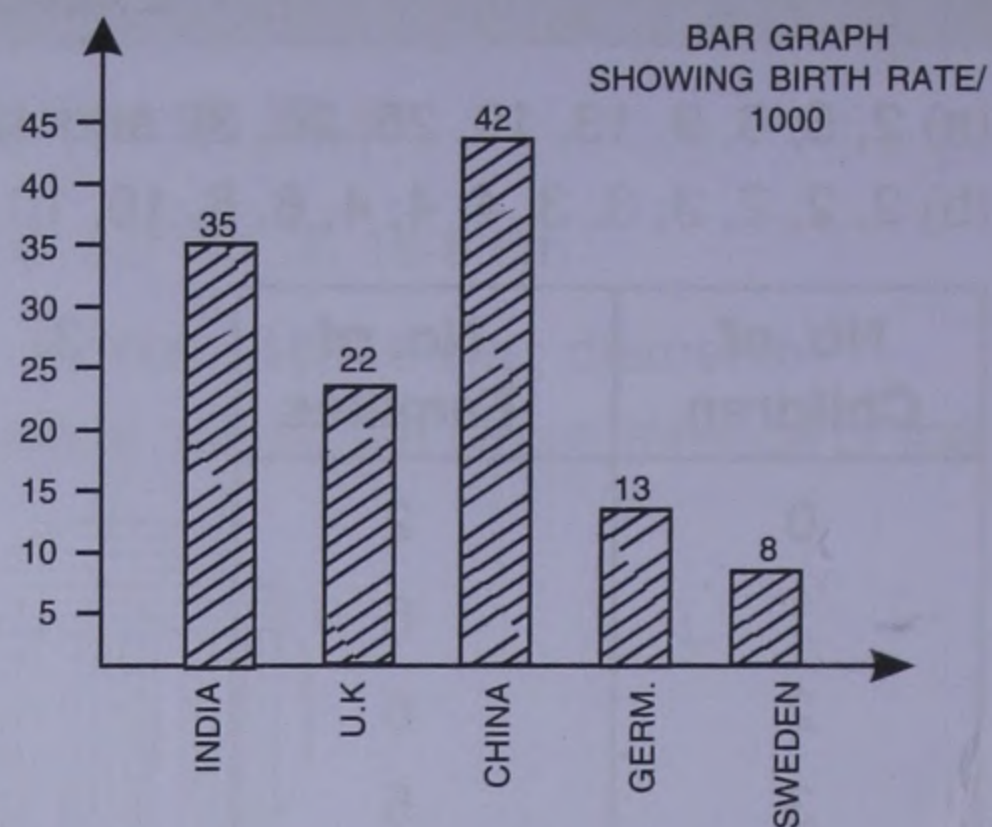
Exercise 33 (B)



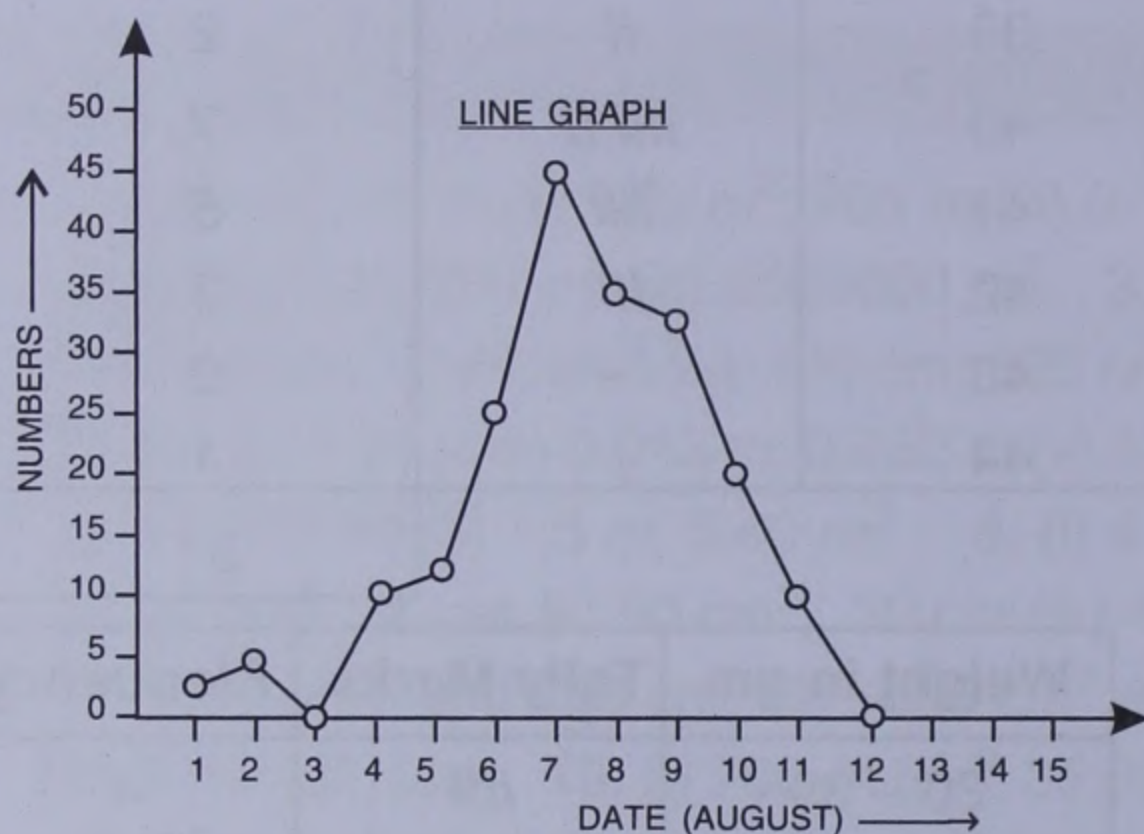
2. (i)



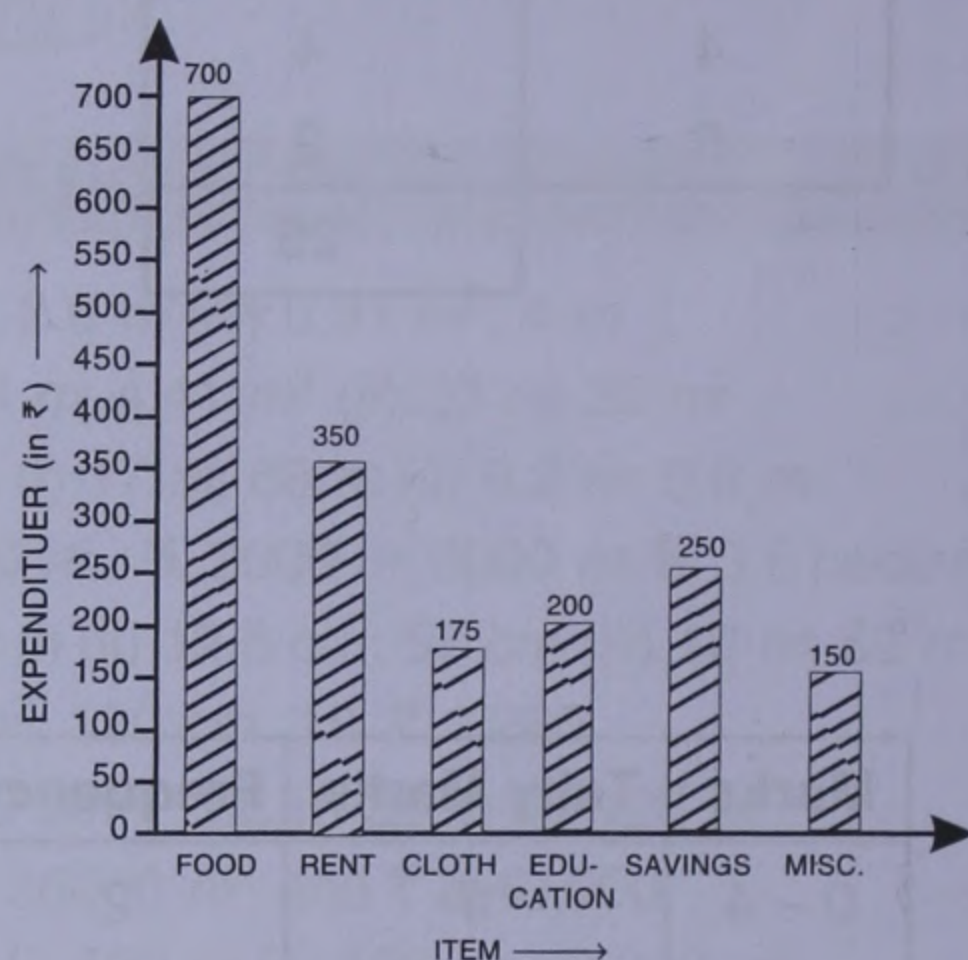
(ii)



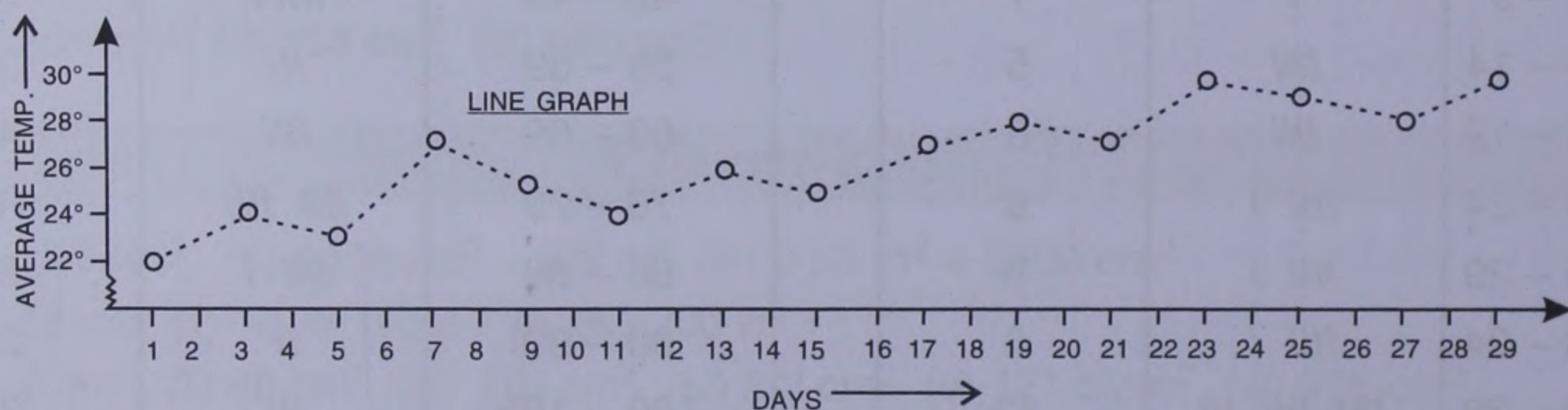
3.



6.

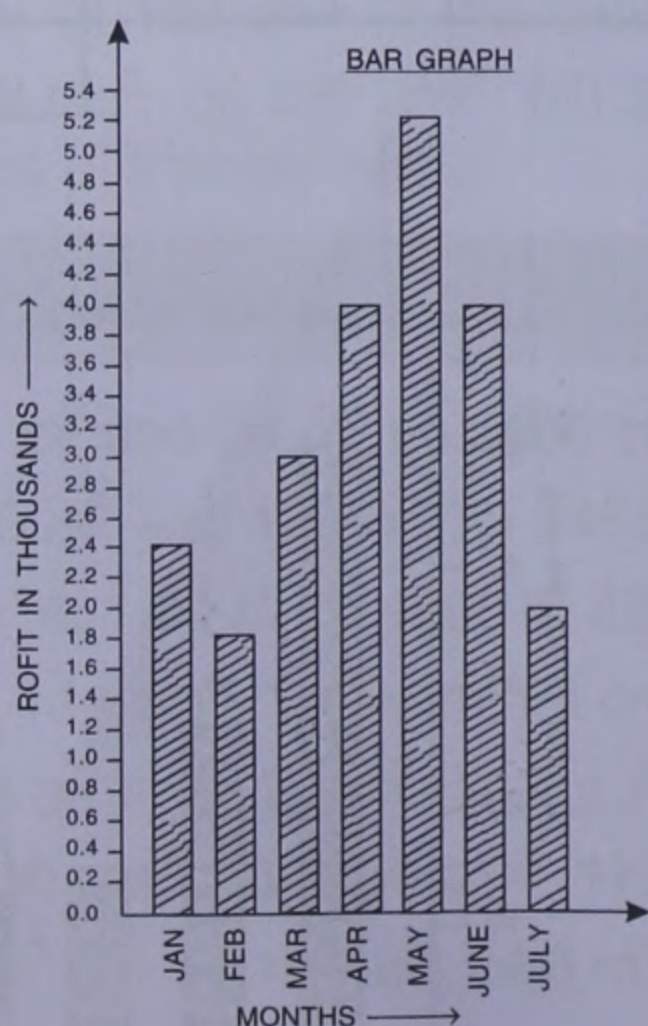


4.

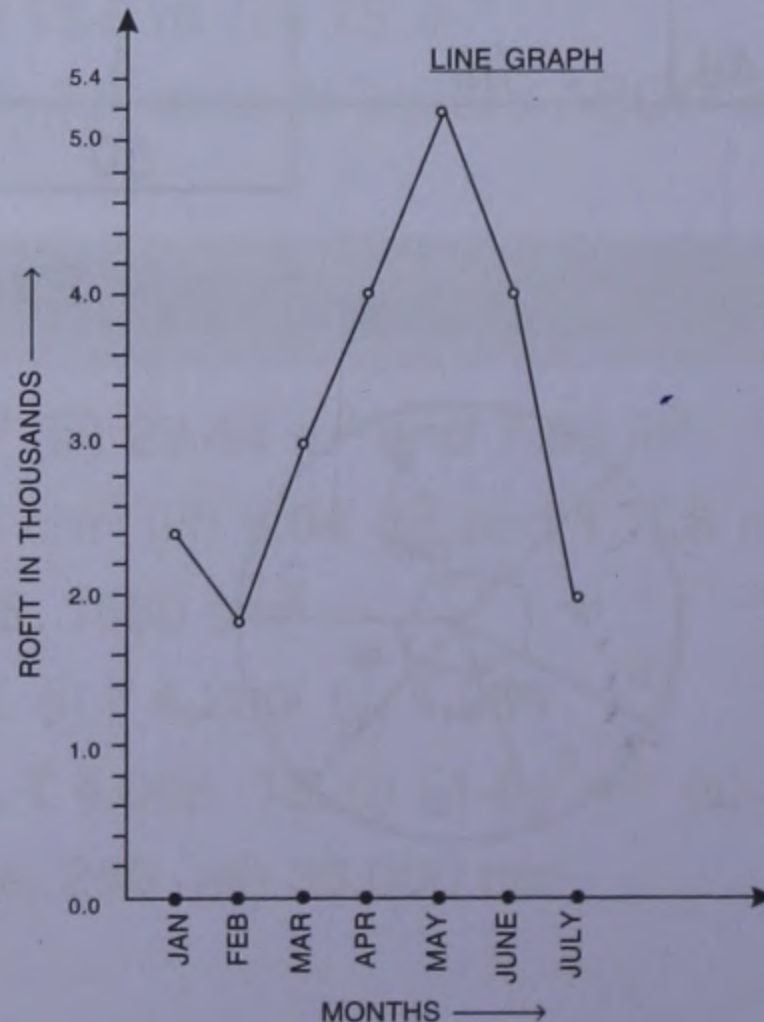


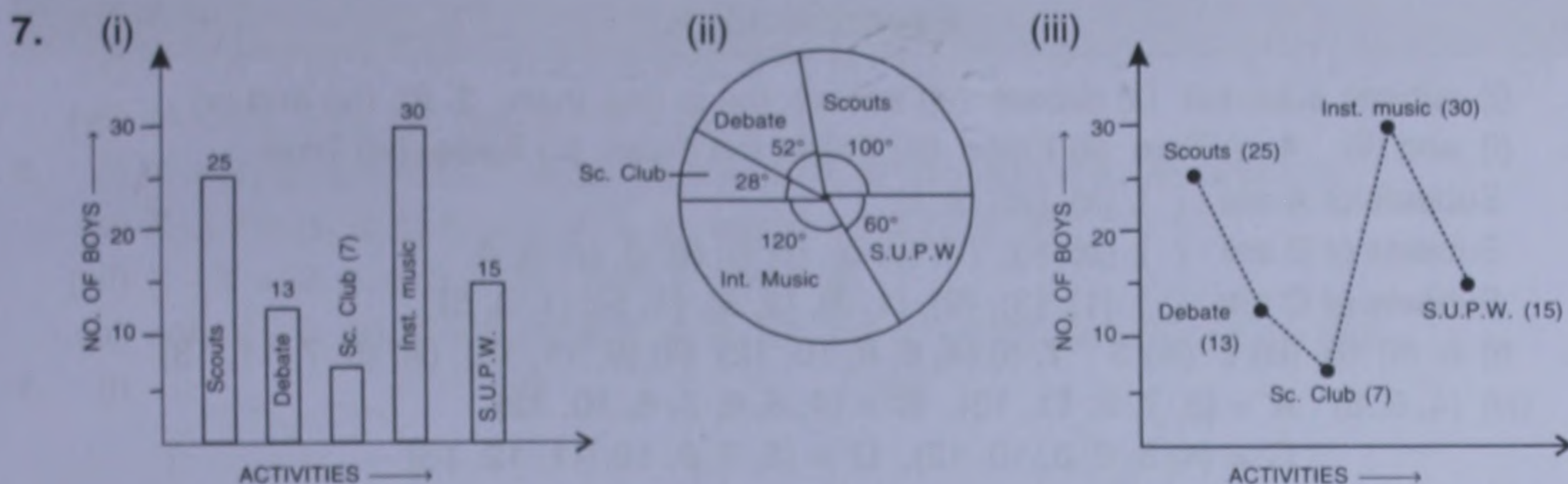
[Zig-zag line on vertical axis shows that temperature below 22° is not taken into consideration]

5. (i)



(ii)





Exercise 33 (C)

1. (i) 5 (ii) 5 (iii) $3\frac{1}{3}$ (iv) 2.95 (v) 59 (vi) 7.125 (vii) $3\frac{38}{45}$ (viii) 1 (ix) 2.5 (x) 5.5
2. 4 3. 4.1 4. 61 5. (a) $5\frac{7}{12}$ (b) $30\frac{1}{3}$ (c) $31\frac{2}{3}$ (d) 10 6. (i) 4.5 (ii) 4.5 (iii) 5.6 (iv) 8
7. $x = 5$ 8. 17

Exercise 34 (A)

1. (i) Not a set (ii) Set (iii) Not a set (iv) Not a set (v) Set.
2. (i) True (ii) True (iii) True, as $\{s, u, c, h, i, s, m, i, t, a\} = \{s, u, c, h, i, m, t, a\}$ (iv) True.
3. (i) $\in$ (ii) $\notin$ (iii) $\in$ (iv) $\in$ (v) $\notin$ (vi) $\in$ (vii) $\notin$ (viii) $\in$
4. (i) $\{17, 19, 21, 23, 25\}$ (ii) $A = \{c, h, i, t, a, m, b, r\}$ (iii) $B = \{16, 18, 20, 22, 24, 26\}$
 (iv) $P = \{a, i, e\}$ (v) $S = \{0, 1, 4, 9, 16, 25, 36, 49\}$
 (vi) $\{12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72, 78, 84, 90\}$
 (vii) $C = \{4, 6, 8, 9, 10, 12, 14, 15, 16, 18\}$ (viii) $D = \{2, 3, 5, 7, 11, 13, 17, 19, 23\}$
 (ix) $E = \{2, 4, 5, 6, 8, 10, 12, 14, 15, 16, 18, 20, 22, 24, 25, 26, 28\}$
 (x) $F = \{1, 2, 3, 4, 6, 8, 12, 24\}$ (xi) $G = \{\text{triangle, circle, square}\}$
 (xii) $H = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$ (xiii) $J = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
 (xiv) $K = \{-2, -1, 0, 1, 2, 3, 4\}$
5. (i) $\{x : x \text{ is a natural number divisible by 3; } x < 18\}$ (ii) $\{x : x \text{ is a prime number}\}$
 (iii) $\{x : x \text{ is perfect square natural number; } x \leq 36\}$ (iv) $\{x : x \text{ is a whole number divisible by 2}\}$
 (v) $\{x : x \text{ is one of the first three days of the week}\}$
 (vi) $\{x : x \text{ is an odd natural number; } x \geq 23\}$
 (vii) $\{x : x = \frac{1}{n}, \text{ where } n \text{ is a natural number; } 3 \leq n \leq 8\}$
 (viii) $\{x : x \text{ is a natural number divisible by 7; } 42 \leq x \leq 77\}$
6. $A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24\}$; $B = \{1, 4, 9, 16\}$;
 $C = \{3, 6, 9, 12, 15, 18, 21, 24\}$; $D = \{2, 3, 5, 7, 11, 13, 17, 19, 23\}$

Exercise 34 (B)

1. (i) 366 (ii) 12 (iii) 7 (iv) 5 (v) 3 (vi) 7 (vii) 5
2. (i) Infinite (ii) ϕ (iii) Finite (iv) Infinite (v) Infinite (vi) ϕ (vii) Infinite (viii) Finite
 (ix) ϕ (x) Finite 3. (ii) 4. (i) Equivalent (ii) Equal (iii) Equivalent (iv) Equivalent
 (v) None (vi) Equivalent (vii) Equal (viii) Equal (ix) None 5. (ii) and (iii)
6. (i) True (ii) True (iii) False (iv) True (v) False (vi) False (vii) False (viii) False
 (ix) True (x) True 7. ϕ and $\{ \}$

Exercise 35 (A)

- (i) subset; superset (ii) subset (iii) subset (iv) is less than 2. (i), (iv) and (v)
- (i) and (ii) 4. (i) True (ii) False (iii) False (iv) False (v) False (vi) True
- Subsets of A are : $\{ \}, \{a\}, \{c\}, \{a, c\}$
Subsets of B are : $\{ \}, \{p\}, \{q\}, \{r\}, \{p, q\}, \{p, r\}, \{q, r\}, \{p, q, r\}$
Subsets of C are : $\{ \}, \{1\}, \{3\}, \{5\}, \{1, 3\}, \{3, 5\}, \{1, 5\}, \{1, 3, 5\}$
- (i) 8 (ii) 15 (iii) 2 (iv) 3 7. (i) $\{4, 6, 8, 10, 12\}$ (ii) $\{9, 11, 13\}$ (iii) $\{5, 7, 11, 13\}$
(iv) $\{4, 6, 8\}$ $A' = \{5, 7, 9, 11, 13\}$, $B' = \{4, 5, 6, 7, 8, 10, 12\}$
 $C' = \{4, 6, 8, 9, 10, 12\}$, $D' = \{5, 7, 9, 10, 11, 12, 13\}$
- (i) $A' = \{1, 3, 5, 7, 9, 10\}$ (ii) $B' = \{2, 4, 6, 8, 10\}$ (iii) $C' = \{4, 5, 6, 10\}$
- (i) $P' = \{1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19, 20, 22, 23, 25, 26, 28, 29\}$
(ii) $Q' = \{1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, 19, 21, 22, 23, 24, 26, 27, 28, 29\}$
(iii) $R' = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29\}$; $n(P) = 10$, $n(Q) = 6$, $n(R) = 3$; $n(P') = 20$, $n(Q') = 24$, $n(R') = 27$
- The number of elements in set P is zero i.e. $P = \phi$. Number of subsets of $P = 2^0 = 1$ and number of its proper subsets = 0.

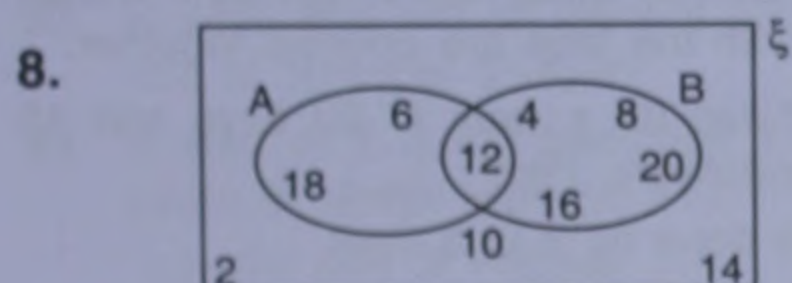
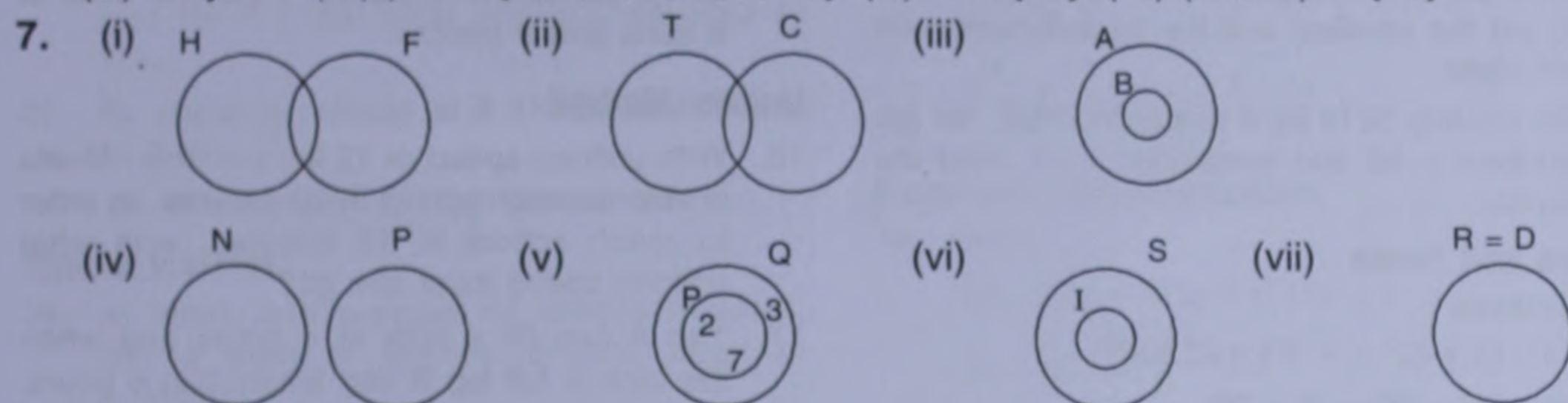
Exercise 35 (B)

- (ii) $\{a, b, c, d, f\}$ (ii) $\{b, c, d\}$ (iii) Yes
- (i) $\{6, 12\}$ (ii) $\{3, 4, 6, 8, 9, 10, 12, 15\}$ (iii) $\{4, 6, 8, 10, 12\}$ (iv) ϕ .
- $A = \{2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26\}$; $B = \{1, 4, 9, 16, 25\}$;
 $C = \{3, 6, 9, 12, 15, 18, 21, 24, 27\}$ and $D = \{2, 3, 5, 7, 11, 13, 17, 19, 23\}$
(i) $\{1, 3, 4, 6, 9, 12, 15, 16, 18, 21, 24, 25, 27\}$,
(ii) $\{2, 3, 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 22, 24, 26, 27\}$,
(iii) $\{1, 2, 3, 4, 5, 7, 9, 11, 13, 16, 17, 19, 23, 25\}$,
(iv) $\{2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 22, 23, 24, 26\}$
(v) $\{4, 16\}$, (vi) $\{9\}$, (vii) $\{6, 12, 18, 24\}$, (viii) $\{ \}$
- (a) $A \cup B = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 11\}$, $B \cup C = \{0, 3, 5, 7, 9, 10, 11, 20, 30\}$,
 $A \cup C = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 10, 20, 30\}$, $A \cap B = \{3, 5, 7\}$,
 $B \cap C = \{ \}$, $C \cap A = \{0\}$ (i) 11 (ii) 3 (iii) 9 (iv) 0 (v) 1 (vi) 12
(b) (i) True (ii) True (iii) False (iv) False (v) True (vi) True (vii) True
- (i) $A - B = \{f, h\}$ (ii) $B - A = \{a, c\}$ (iii) $B - C = \{a, b, c\}$ (iv) $C - A = \{g\}$ (v) $\{e, g\}$
(vi) $\{a, c\}$ (vii) $\{a, c, f, h\}$ 6. (i) ϕ (ii) $\{3, 4, 5, 6, 7, 9, 10, 11, 12\}$ (iii) A (iv) $\{4, 6, 10, 12\}$
(v) $\{3, 4, 6, 7, 8, 9, 10, 12\}$ (vi) ϕ 7. (i) 15 (ii) 15 (iii) yes
- (i) $\{4, 6, 8, 10, 11\}$ (ii) $\{6, 8, 10\}$ (iii) $\{8, 10\}$ and $\{6\}$ (iv) $\{6, 8, 10\}$ (v) Yes
- (i) $\{b, d\}$ (ii) $\{a, b, c, d, f\}$ (iii) $\{a, b, c, d, e, f\}$ and $\{a, b, c, d, f, g\}$ (iv) $\{a, b, c, d, f\}$ (v) Yes

Exercise 36 (A)

- (i) $\{a, b, c, d, e, f\}$ (ii) $\{b, e\}$ (iii) $\{a, d\}$ (iv) $\{g, h\}$
- (i) $\{2, 3, 6, 7, 8\}$ (ii) $\{1, 5, 6, 7, 8\}$ (iii) $\{1, 2, 3, 5, 6, 7, 8\}$ (iv) $\{1, 2, 3, 5, 6, 7, 8\}$
(v) Yes 3. (i) $\{10, 11\}$ (ii) $\{3, 4, 8, 10, 11\}$ (iii) $\{10, 11\}$ (iv) Yes
- (i) $\xi = \{a, b, c, d, e, f, g, h, i, j, k, m, n\}$ (ii) $A \cup B = \{a, b, c, d, e, f, g, i, k\}$
(iii) $A \cap B = \{a, d\}$ (iv) $A \cap B' = \{b, e, f, i\}$ (v) $B \cap A' = \{c, g, k\}$
(vi) $\{b, c, e, f, g, h, i, j, k, m, n\}$ (vii) $(A \cup B)' = \{h, j, m, n\}$ (viii) $A - B = \{b, e, f, i\}$
(ix) only $B = \{c, g, k\}$

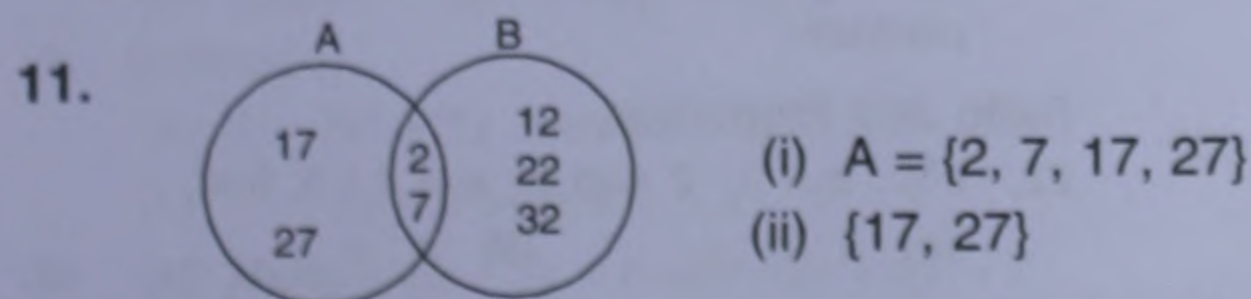
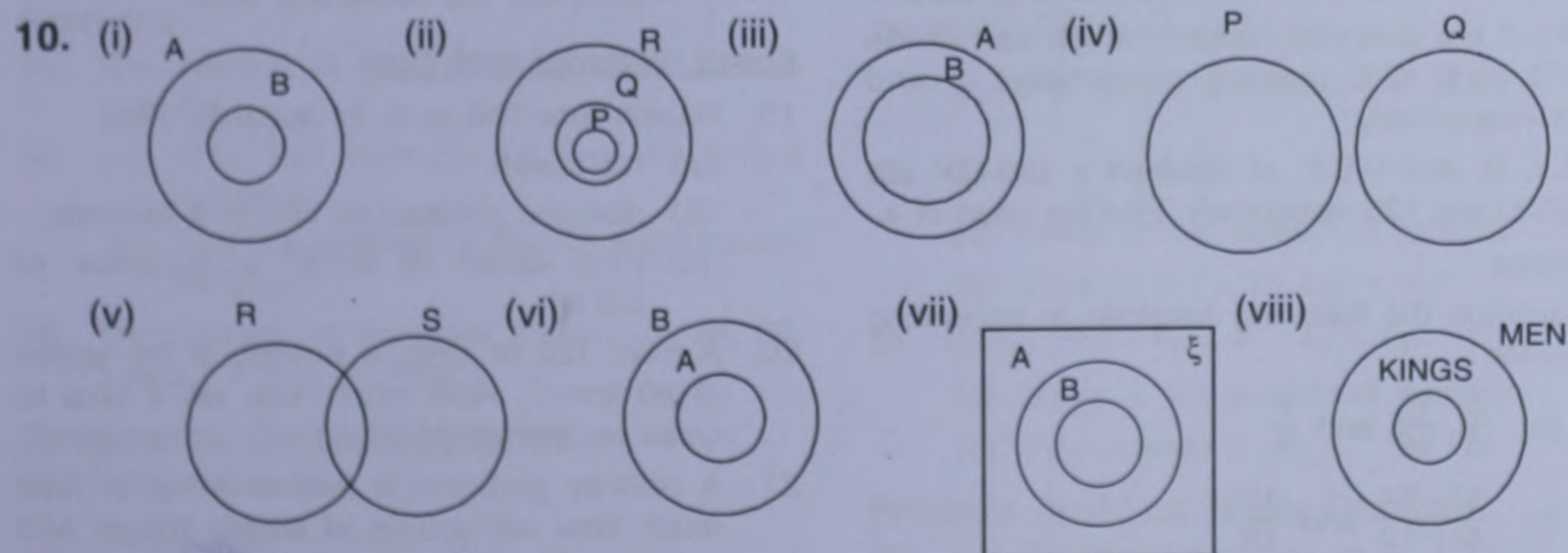
5. (i) $A \cup B = \{2, 3, 5, 6, 8, 9, 10\}$ (ii) $A \cap B = \phi$ (iii) $A \cap B' = \{2, 6, 8, 9\}$
 (iv) $B \cap A' = \{3, 5, 10\}$ (v) $A - B = \{2, 6, 8, 9\}$ (vi) $(A \cap B)' = \{2, 3, 4, 5, 6, 7, 8, 9, 10\}$
 (vii) $(A \cup B)' = \{4, 7\}$ (viii) $B - A = \{3, 5, 10\}$
6. (i) $X = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ (ii) $Y = \{1, 6, 8\}$ (iii) $n(X) = 9$ (iv) $n(Y) = 3$
 (v) $X \cup Y = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ (vi) $X \cap Y = \{1, 6, 8\}$
 (vii) $X - Y = \{2, 3, 4, 5, 7, 9\}$ (viii) $Y \cap X' = \phi$
 (ix) only $Y = \phi$ (x) $Y' = \{2, 3, 4, 5, 7, 9, 10\}$ (xi) $X' = \{10\}$ (xii) $(X \cup Y)' = \{10\}$



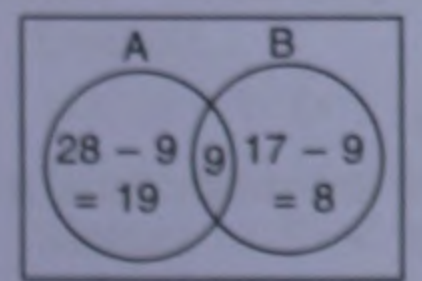
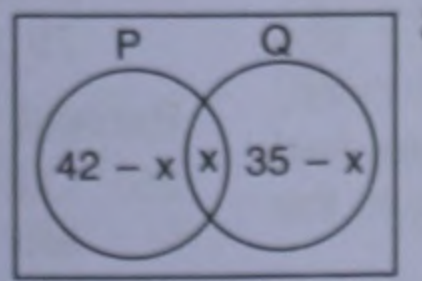
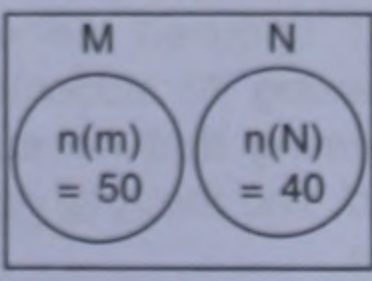
$$A \cup B = \{4, 6, 8, 12, 16, 18, 20\}$$

$$A \cap B = \{12\}$$

9. (i) $A - B$ (ii) $(P \cap Q)'$ (iii) $(A \cup B)'$ (iv) $(A - B) \cup (B - A)$ or $(A \cup B) - (A \cap B)$



Exercise 36 (B)

1.  (i) 36 (ii) 19 (iii) 8
2.  (i) 17 (ii) 25 (iii) 18
3.  $\xi = 90$

4. 7 5. 15 6. (i) 15 (ii) 45 7. 64 8. (i) 160 (ii) 70 9. 8 10. 40 percent 11. (i) 5 (ii) 17
 12. 19 13. $n(A \cap B) = 0$, $n(A \cup B) = 95$ 14. 5 15. (i) 58 (ii) 35