

ANSWERS

Exercise 1(A)

1. (i) kg, 20 times (ii) m (metre), 80 times (iii) 5 cm (iv) 24 kg (v) 53 and fifty three; 9 and nine; 240 and two hundred forty 2. (i) 600 and 4 (ii) 8 and 9 (iii) 5000 and 3 (iv) 6 and 6 3. 891 4. (i) 500 (ii) 6 (iii) 506 5. (i) 18 (ii) 0 6. 0 and 6.

Exercise 1(B)

1. (i) 7532 and 2357 (ii) 9641 and 1469 (iii) 7420 and 2047 (iv) 8531 and 1358 (v) 9760 and 6079 3. 9857 and 1052 4. (i) 99999 and 100000 (ii) $1000 - 999 = 1$ (iii) $100 + 99 = 199$ (iv) 2 (v) 3 (vi) 0 or 5 (vii) 1,00,000 and six (viii) 999 and largest 5. 965320 6. 1023 and 9876 7. 97865 and 10823 8. 10,999 9. 8,99,999 10. (i) 9012, 2010, 504, 11112 and 99912 (ii) 9012, 4005, 2010, 504, 111111, 11112, 11121, and 99912 (iii) 4005 and 2010 (iv) 2010 11. (i) 2000 (ii) 2000 12. 2000 13. 333, 366, 388, 368, 386, 336, 338, 363, 383, 666, 633, 688, 638, 683, 663, 668, 636, 686, 888, 833, 866, 836, 863, 883, 886, 838 and 868 14. 368, 386, 638, 683, 836 and 863. 15. (i) 10, 12, 24, 26, 48, 64 and 72 (ii) 12, 15, 21, 24, 39, 48 and 72 (iii) 12, 24, 48 and 72.

Revision Exercise (Chapter 1)

1. (i) kg, 5 (ii) m, 20 times (iii) figure, fifteen (iv) 40 and 4 (v) 8000 and 8000 (vi) 7 and 7 (vii) 22 (viii) 6004 (ix) 999 and 1000 (x) 9876 and 1023 2. Largest = 8754, smallest = 3045 3. (i) 14, 3290 and 56298 (ii) 51,105 and 56298 (iii) only 3290 (iv) 56298 4. 1000 5. (iii) 9930 and 3009 (iv) 7731 and 1137 6. (i) 7354, 7345, 7435, 7453, 7534 and 7543 (ii) 8402, 8420, 8024, 8042, 8240 and 8204 (iii) 6349, 6394, 6439, 6493, 6943, 6934, 9643, 9634, 9463, 9436, 9346 and 9364.

Exercise 2(A)

1. (i) 27 and 27 (ii) 16, 16 and -16 (iii) positive or zero 2. (i) True (ii) False (iii) True (iv) False (v) False (vi) True 3. (i) 7 (ii) 15 (iii) 8 (iv) 22 (v) -8 (vi) 8 4. (i) 12 (ii) 7 (iii) 0 (iv) 3 5. (i) $(+28) < (+35)$ (ii) $(-35) < (-28)$ (iii) $(-7) < (+2)$ (iv) $(+12) > (-12)$ (v) $0 > (-25)$ (vi) $(-33) < 0$ (vii) $(+18) > 0$ 6. $-23 < -12 < 0 < 5 < 17$ 7. $17 > 12 > 0 > -6 > -13$ 8. (i) Loss of ₹ 80 (ii) Going 50 km towards West (iii) Going 60 m above sea-level (iv) Losing ₹ 3,250 (v) Going 37 m due South (vi) Gaining weight of 4.7 kg (vii) An increase of 23% (viii) Fall of 55% of the cost (ix) 22 m towards right (x) 17° below 33° (xi) Depositing ₹ 235 in a bank (xii) Taking ₹ 1,000 from Ramesh 9. (i) loss of ₹ 8 (ii) gain of ₹ 20 (iii) gain of ₹ 36 (iv) loss of ₹ 50 10. (i) rise in temperature by 50°C (ii) no change in temperature (iii) fall in temperature by 30°C (iv) fall in temperature by 20°C 11. (i) walking 20 km towards North (ii) walking 30 km towards South (iii) walking 70 km towards South 12. (i) 5 m below the earth's surface (ii) 12 m above the earth's surface (iii) 34 m above the earth's surface 13. (i) +35 (ii) -78 14. 17 m due North 15. (i) -35°C (ii) -5°C (iii) 22°C 16. (i) -29°C (ii) 47°C (iii) 26°C .

Exercise 2(B)

1. (i) +131 (ii) -131 (iii) -19 (iv) +19 (v) 1425 (vi) -570 (vii) -407 (viii) -255 2. (i) 8 (ii) -22 (iii) -8 (iv) 22 (v) -147 (vi) 80 (vii) -57 (viii) -796 (ix) -87 3. (i) 56 (ii) 56 (iii) -56 (iv) -56 (v) 0 (vi) 0 4. (i) -8 (ii) +8 (iii) -8 (iv) +8 (v) 0 (vi) 0 (vii) +666 (viii) -83 (ix) -19 (x) +82 (xi) -144 5. (i) -7 (ii) +9 (iii) 0 (iv) +4 (v) -13 (vi) -12 (vii) -25 (viii) +3 (ix) -1 (x) -98 (xi) 0 (xii) 0 6. (i) 15 (ii) -107 (iii) -111 (iv) 97 (v) 250 (vi) +85 (vii) -192 (viii) +108 (ix) -216 (x) 0 (xi) 120 (xii) -720 7. (i) True (ii) False (iii) False (iv) False (v) True (vi) False (vii) True (viii) False (ix) False (x) False 8. (i) +8 (ii) -8 (iii) positive (iv) integers (v) zero (vi) -1

Exercise 2(C)

1. 89 2. 2 3. -72 4. -240 5. 108 6. 12 7. 13 8. 21 9. -6 10. 10

Revision Exercise (Chapter 2)

1. (i) True (ii) False (iii) True 2. (a) (i) -36 (ii) -19 (iii) 23 (iv) -108 (v) -45 (b) (i) -23 (ii) 23 (iii) -101 (iv) -101 (c) (i) 342 (ii) -408 (iii) -1568 (iv) 728 (d) (i) 3 (ii) -3 (iii) -6 (iv) 16 3. (i) 19 (ii) -19 (iii) 19 (iv) -175 (v) 343 (vi) -343 (vii) -21 (viii) -180 (ix) 720 (x) 0 4. (i) a profit of ₹ 26 (ii) a profit of ₹ 26 (iii) a loss of ₹ 21 (iv) a loss of ₹ 39 5. (i) 32 m below the water surface (ii) 17 m below the water surface (iii) 20 m above the water surface (iv) 26 m below the water surface 6. (i) 44 (ii) -44 (iii) 8 (iv) -8 7. (i) -61 (ii) 35 (iii) -35 (iv) 61 8. (a) (i) 816 (ii) 816 (iii) 16 (iv) 16 (b) Yes; by changing the order of multiplication of given integers; the result does not change. (c) Yes; by changing the order of addition of given integers, the result does not change.

Exercise 3(A)

1. (i) greater (ii) left (iii) right (iv) less, greater (v) greater, less (vi) greater, less (vii) less, greater (viii) greater, less 2. (i) -15 (ii) 15 (iii) 8 (iv) 0 3. (i) -6 (ii) -3 (iii) -51 (iv) 0 4. (i) $3 > 0$ (ii) $0 > -8$ (iii) $-9 < -3$ (iv) $-3 < 3$ (v) $5 > -1$ (vi) $-13 < 0$ (vii) $-8 > -18$ 5. (i) -8, -5, -1, 0, 4, 5 (ii) -7, -6, -3, 0, 2, 3, 4 6. (i) 15, 8, 0, -2, -3, -5 (ii) 23, 12, 7, 6, 0, -11 7. (i) False (ii) True (iii) True (iv) True (v) False (vi) False

Exercise 3(B)

1. (i) +11 (ii) +6 (iii) +5 2. (i) +1 (ii) -2 (iii) +3 3. (i) +2 (ii) -3 (iii) -4 4. (i) -3 (ii) -7 (iii) -7 5. (i) +8 (ii) +13 (iii) -8 (iv) -12 (v) +6 (vi) -4

Revision Exercise (Chapter 3)

1. (i) greater than and smaller than (ii) smaller and greater (iii) smaller (iv) smaller 2. -15, -8, -3, 0 and 7 3. 15, 8, 2, 0, -1, -6 and -12 4. (i) +9 (ii) +14 (iii) +2 (iv) +4 (v) +4 (vi) 0 (vii) -10 (viii) -8 (ix) +4 (x) +8 (xi) +5 (xii) -5

Exercise 4(A)

1. (i) 1, 3, 5 and 15 (ii) 1, 5, 11 and 55 (iii) 1, 2, 3, 4, 6, 8, 12, 16, 24 and 48 (iv) 1, 2, 3, 4, 6, 9, 12, 18 and 36 (v) 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42 and 84

2. (i) 2, 3, 5, 7, 11, 13, 17, 19 and 23 (ii) 17, 19, 23, 29 and 31 (iii) 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71 and 73 3. (i) 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41 and 43 (ii) 2, 3, 5, 7, 11, 13, 17, 19, 23, 29 and 31 (iii) 11, 13, 17, 19, 23, 29, 31, 37, 41, 43 and 47 (iv) 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53 and 59 4. (i) 2 (ii) 3 (iii) 5 and 7 (iv) 7 5. (i) 2 and 3 (ii) 2 and 3 (iii) 2 and 5 (iv) 2, 3 and 7

Exercise 4(B)

1. (i) 1 (ii) 5 (iii) 3 (iv) 2 (v) 3 2. (i) 1 (ii) 1 (iii) 20 (iv) 4 (v) 4 3. (i) 8 (ii) 6 (iii) 1 (iv) 10 (v) 2 4. (i) 15 (ii) 12 (iii) 33 (iv) 12 (v) 15 5. 45 7. 15 and 16; 15 and 28; 16 and 21 8. 18

Exercise 4(C)

1. (i) 24 (ii) 60 (iii) 36 2. (i) 288 (ii) 600 (iii) 294 (iv) 726 (v) 510 3. 100 4. 6 5. 480 6. 360 7. 1439 8. 867

Revision Exercise (Chapter 4)

1. (i) 12 (ii) 6 2. (i) 5040 (ii) 2640 3. (i) True (5 and 11 are two prime numbers and their H.C.F. is 1) (ii) True (4 and 9 are two co-prime numbers and their H.C.F. is 1) (iii) True (5 and 11 are prime numbers and their L.C.M. = $5 \times 11 = 55$) (iv) True (4 and 9 are two co-prime numbers and their L.C.M. = $4 \times 9 = 36$) 4. 336 5. 24 6. (i) 84, which is the L.C.M. of given numbers (ii) 14, which is the H.C.F. of given numbers. 7. 840 and 28 8. 18 and 2700

Exercise 5(A)

1. (i) $\frac{2}{7}$ (ii) $\frac{5}{17}$ (iii) $\frac{3}{5}$ 2. (i) proper (ii) improper (iii) improper (iv) 1 (v) -1 (vi) mixed (vii) like (viii) unlike (ix) equal (x) like (xi) 2 ; $\frac{41}{13}$ (xii) $-\frac{4 \times 5 + 3}{5} = -\frac{23}{5}$ 3. (i) $\frac{2}{9}$, $\frac{7}{15}$, $\frac{11}{20}$, $\frac{18}{23}$ and $\frac{27}{35}$ (ii) $\frac{4}{3}$ and $\frac{20}{11}$ 4. (i) $\frac{11}{5}$ (ii) $\frac{13}{4}$ (iii) $\frac{57}{8}$ (iv) $\frac{23}{11}$ 5. (i) $5\frac{15}{17}$ (ii) $7\frac{4}{11}$ (iii) $-29\frac{6}{7}$ (iv) $-7\frac{8}{15}$ 6. (i) $\frac{20}{60}$, $\frac{24}{60}$, $\frac{45}{60}$, $\frac{10}{60}$ (ii) $\frac{100}{120}$, $\frac{105}{120}$, $\frac{110}{120}$, $\frac{36}{120}$ (iii) $\frac{32}{112}$, $\frac{98}{112}$, $\frac{40}{112}$, $\frac{63}{112}$

Exercise 5(B)

1. (i) $\frac{4}{5}$ (ii) $\frac{2}{3}$ (iii) $\frac{2}{9}$ (iv) $\frac{1}{3}$ (v) $\frac{3}{2}$ 2. (i) False (ii) True (iii) False (iv) False (v) False 3. (i) $\frac{2}{3}$ (ii) $\frac{3}{4}$ (iii) $\frac{11}{14}$ 4. (i) $\frac{3}{8}$ (ii) $\frac{8}{15}$ (iii) $\frac{10}{39}$ 5. (i) $\frac{7}{8}$, $\frac{13}{24}$, $\frac{5}{16}$ (ii) $\frac{4}{5}$, $\frac{3}{4}$, $\frac{11}{20}$, $\frac{7}{15}$ (iii) $\frac{9}{11}$, $\frac{5}{7}$, $\frac{3}{8}$ 6. (i) $\frac{1}{4}$, $\frac{9}{16}$, $\frac{7}{12}$ (ii) $\frac{2}{7}$, $\frac{1}{3}$, $\frac{5}{6}$, $\frac{8}{9}$ (iii) $\frac{3}{8}$, $\frac{5}{9}$, $\frac{2}{3}$, $\frac{5}{6}$ 7. $\frac{7}{12}$ 8. (i) < (ii) < (iii) = (iv) > 9. (i) $\frac{25}{18}$ (ii) $\frac{7}{25}$

Exercise 5(C)

1. (i) $2\frac{1}{8}$ (ii) $3\frac{3}{10}$ (iii) $5\frac{1}{8}$ (iv) $7\frac{13}{24}$ (v) $7\frac{1}{3}$ (vi) $8\frac{41}{48}$ 2. (i) $1\frac{5}{48}$ (ii) $\frac{11}{12}$ (iii) $2\frac{13}{42}$ (iv) $2\frac{7}{12}$ (v) $4\frac{23}{30}$ (vi) $3\frac{1}{4}$ (vii) $3\frac{23}{24}$ (viii) $\frac{3}{10}$ (ix) $3\frac{5}{24}$ (x) $2\frac{11}{12}$ (xi) $\frac{29}{45}$

Exercise 5(D)

1. (i) $\frac{6}{35}$ (ii) $\frac{4}{15}$ (iii) $3\frac{1}{3}$ (iv) $\frac{1}{4}$ (v) $13\frac{1}{56}$ (vi) $\frac{1}{8}$ (vii) 1 (viii) $2\frac{1}{7}$ 2. (i) $\frac{5}{9}$ (ii) $10\frac{1}{8}$
 (iii) $\frac{5}{2} = 2\frac{1}{2}$ (iv) 1 (v) $1\frac{1}{3}$ (vi) $3\frac{9}{11}$ 3. (i) $\frac{20}{21}$ (ii) $\frac{15}{32}$ (iii) 0 (iv) $\frac{8}{9}$ (v) $3\frac{15}{16}$ (vi) $\frac{48}{49}$
 (vii) $6\frac{17}{18}$ (viii) $\frac{1}{3}$ 4. (i) $7\frac{6}{11}$ (ii) $1\frac{9}{11}$ (iii) $\frac{28}{111}$ (iv) $\frac{11}{20}$ (v) $\frac{30}{49}$ (vi) $2\frac{1}{4}$ (vii) $\frac{1}{1152}$
 5. (i) 10 (ii) $1\frac{1}{60}$ (iii) $3\frac{3}{32}$ (iv) $\frac{4}{5}$ (v) $-1\frac{1}{8}$ (vi) $16\frac{1}{14}$ (vii) $\frac{1}{30}$ (viii) $-\frac{7}{204}$ (ix) $\frac{173}{330}$
 (x) $2\frac{1}{5}$ (xi) $23\frac{8}{9}$

Exercise 5(E)

1. $5\frac{7}{8}$ m 2. $4\frac{4}{5}$ m 3. ₹ $51\frac{1}{2}$ 4. 340 5. 88 g 6. $\frac{1}{6}$ 7. ₹ 1,152 8. 400 9. 4 km
 10. 20 km 11. ₹ 1,944

Revision Exercise (Chapter 5)

3. (i) $\frac{17}{18}$ (ii) $\frac{1}{4}$ (iii) $1\frac{1}{14}$ (iv) $1\frac{2}{9}$ (v) $3\frac{5}{6}$ (vi) $3\frac{1}{6}$ 4. ₹ 1,95,000 5. ₹ 46,200
 6. $8\frac{1}{2}$ km 7. 16 8. (i) ₹ 900 (ii) ₹ 360 9. ₹ 24,000 10. (i) $7\frac{1}{33}$ (ii) $1\frac{2}{9}$ (iii) $\frac{8}{9}$

Exercise 6(A)

1. (i) 2 (ii) 3 (iii) 1 (iv) 4 (v) 5 2. (i) 1.360, 239.800 and 47.008 (ii) 507.07520, 8.52073 and 0.80800 (iii) 459.220000, 7.030930 and 0.200037 3. (i) 0.7 (ii) 4.7
 (iii) 3.43 (iv) 0.003 (v) 0.07295 (vi) 0.000289 (vii) 0.95 4. (i) 0.75 (ii) 0.075 (iii) 0.008
 (iv) 0.28 5. (i) $\frac{1}{20}$ (ii) $3\frac{19}{20}$ (iii) $4\frac{1}{200}$ (iv) $\frac{219}{250}$ (v) $50\frac{3}{50}$ (vi) $\frac{43}{4000}$ (vii) $4\frac{4403}{5000}$

Exercise 6(B)

1. (i) 5.722 (ii) 1.5938 (iii) 258.21 (iv) 232.37 (v) 0.65046 2. (i) 4.16 (ii) 0.9696
 (iii) 0.02 (iv) 0.488 3. (i) 0.54 (ii) 20.0978 (iii) 0.42 (iv) 15.998 (v) 9.05
 4. (i) 1.145 (ii) 4.124 (iii) 1.197 (iv) 25.234 (v) 1.1098 5. 52.185 6. 11.66
 7. 27.467 8. 2.829 9. 20.4627 10. 910.624

Exercise 6(C)

1. (i) 44.8 (ii) 346.14 (iii) 58.466 (iv) 1.5855 (v) 18.75 (vi) 3.384 (vii) 5.8478
 (viii) 1.16388 2. (i) 0.0208 (ii) 3.61 (iii) 10.368 (iv) 0.4374 (v) 3.375 (vi) 0.000625
 (vii) 0.0000004 3. (i) 39, 390 and 3900 (ii) 28.9, 289 and 2890 (iii) 0.829, 8.29 and 82.9
 (iv) 403, 4030 and 40300 (v) 3.725, 37.25 and 372.5 4. (i) 1.08 (ii) 0.0012 (iii) 1.29
 (iv) 0.1068 (v) 3.27 (vi) 0.356 (vii) 0.252 (viii) 1.03 (ix) 0.6 5. (i) 4.979, 0.4979 and 0.04979
 (ii) 0.0923, 0.00923 and 0.000923 (iii) 0.00704, 0.000704 and 0.0000704
 6. (i) 20 (ii) 70 (iii) 2.4 (iv) 5.4 (v) 10.33 (vi) 110 (vii) 640 (viii) 2025 7. (i) 10
 (ii) 1000 (iii) 100 (iv) 10000 (v) 1000 (vi) 1000 (vii) 100 (viii) 10 (ix) 1000 (x) 100
 (xi) 10000 8. (i) 6.466 (ii) 65.14 (iii) 297.106 (iv) 248.45 (v) 1.1346

Exercise 6(D)

- (i) 840 p (ii) 97 p (iii) 9 p (iv) 6235 p
- (i) ₹ 0.55 (ii) ₹ 0.08 (iii) ₹ 6.95 (iv) ₹ 32.79
- (i) 600 cm (ii) 854 cm (iii) 308 cm (iv) 87 cm (v) 3 cm (vi) 2504 cm
- (i) 2.50 m (ii) 23.28 m (iii) 0.86 m (iv) 0.04 m (v) 1.07 m
- (i) 6000 gm (ii) 5543 gm (iii) 78 gm (iv) 3620 gm (v) 4500 gm
- (i) 7 kg (ii) 6.839 kg (iii) 0.445 kg (iv) 0.093 kg (v) 0.008 kg (vi) 13.545 kg
- (i) ₹ 17.37 (ii) ₹ 29.35 (iii) ₹ 2.81 (iv) ₹ 15.44
- (i) ₹ 27.48 (ii) ₹ 4.16 (iii) ₹ 0.66 = 66 paise
- (i) 4.18 m (ii) 11.38 m (iii) 1.57 m
- (i) 14.57 m (ii) 1028.72 m (iii) 0.38 m
- (i) 59.924 kg (ii) 2.717 kg (iii) 4.088 kg
- (i) 6.138 kg (ii) 18.683 kg (iii) 3.371 kg

Exercise 6(E)

- ₹ 106
- ₹ 8.73
- 2.58 m
- 10.75 m
- 3.225 km
- ₹ 1,265.75
- 35.7 m
- 5.65 m = 5 m 65 cm
- (i) 0.467 kg = 467 gm (ii) 2.335 kg
- 240.36 m; 20.03 m

Revision Exercise (Chapter 6)

- (i) $5.054 < 5.0543 < 5.245 < 5.250$ (ii) $62.344 < 62.434 < 62.443 < 62.444$
- 0.195
- 0.538
- 55.627
- (i) 72.712 kg (ii) 7.364 kg
- 5.829
- ₹ 99
- (i) 0.512 (ii) 0.8 (iii) 0.8 (iv) 1.25 (v) 0.8
- (i) 23.8 (ii) 23.8. Yes both are equal.
- (i) 4.272 (ii) 4.272. Yes both are equal.
- 0.97 m
- 62.16 km
- ₹ 1,754.38
- (i) ₹ 43.50 (ii) ₹ 67.60 (iii) ₹ 91.20. Total = ₹ 202.30
- 79.219

Exercise 7(A)

- (i) x and y (ii) 4 and -6 (iii) 8^5 (iv) $(-2)^{10}$
- (i) 1 (ii) -1 (iii) -64 (iv) -1 (v) 15 (vi) 27 (vii) -32 (viii) 0
- (i) -32 (ii) $-1,000$ (iii) 10,000 (iv) 2401
- (i) $\frac{16}{81}$ (ii) $\frac{1}{64}$ (iii) $-\frac{8}{343}$ (iv) $\frac{81}{625}$
- (i) $\frac{2^3}{3^2}$ (ii) $3^3 \times 2^1$ (iii) 5^5 (iv) $\frac{2^2 \times 3^2}{5^2}$ (v) $\frac{5^4}{11^2}$
- (i) -108 (ii) 512 (iii) -125
- (i) 27 (ii) 256 (iii) 250 (iv) 9 (v) -64 (vi) 144 (vii) 3 (viii) -54 (ix) 9 (x) 3

Exercise 7(B)

- (i) x^{a+b} (ii) a^{11} (iii) a^5b^3 (iv) $2^3 \times 3^2 = 72$ (v) $5^3 = 125$ (vi) $\frac{1}{5^2} = \frac{1}{25}$ (vii) $8^2 = 64$ (viii) a^6b^8 (ix) $\frac{1}{2^4} = \frac{1}{16}$ (x) $4^6 = 4096$
- (i) $\frac{1}{9}$ (ii) 16 (iii) 16 (iv) $\frac{8}{25}$ (v) 225
- (i) -108 (ii) 500 (iii) 1 (iv) -3
- (i) 0 (ii) 3
- (i) 18 (ii) 72 (iii) 72 (iv) 9 (v) 90

Exercise 7(C)

- $1^2, 2^2, 3^2, 4^2$ and $5^2 = 1, 4, 9, 16$ and 25
- $2^2, 4^2, 6^2, 8^2, 10^2$ and $12^2 = 4, 16, 36, 64, 100$ and 144
- $1^2, 3^2, 5^2$ and $7^2 = 1, 9, 25$ and 49.
- $2^2, 3^2, 5^2, 7^2$ and $11^2 = 4, 9, 25, 49$ and 121.
- (i) 81 (ii) $\frac{4}{25}$ (iii) $1\frac{32}{49}$ (iv) $7\frac{9}{16}$
- (i) 9 (ii) $\frac{4}{9}$ (iii) $1\frac{24}{25}$ (iv) $5\frac{1}{16}$
- (i) 6.25 (ii) 0.36 (iii) 0.0529 (iv) 0.0004 (v) 2.56 (vi) 0.64.

Exercise 7(D)

1. (i) 2 (ii) 7 (iii) 11 (iv) 0.8 2. (i) 8 (ii) 12 (iii) 15 (iv) 18 (v) 21 (vi) 22
 (vii) 25 (viii) 27 3. (i) $\frac{2}{3}$ (ii) $\frac{3}{4}$ (iii) $\frac{5}{8}$ (iv) $1\frac{1}{3}$ (v) $1\frac{1}{4}$ (vi) $1\frac{3}{7}$ 4. (i) 14 (ii) 27
 (iii) 40 (iv) 30 (v) 432 (vi) $6\frac{3}{5}$ 5. (i) 28 (ii) 36 (iii) 200 6. (i) 24 (ii) 100 (iii) 60
 (iv) 270 (v) 320 (vi) 144 (vii) 24 (viii) 10800 (ix) 7 (x) $9\frac{3}{5}$ (xi) $1\frac{1}{4}$ (xii) $13\frac{1}{2}$
 7. (i) 9 (ii) 1 (iii) 20 (iv) 3 (v) 5 (vi) 2

Exercise 7(E)

1. 0^3 , 1^3 and $2^3 = 0$, 1 and 8 2. 4^3 , 5^3 , 6^3 and $7^3 = 64$, 125, 216 and 343 3. $(-2)^3$, $(-1)^3$, 0^3 , 1^3 and $2^3 = -8$, -1, 0, 1 and 8 4. $(-5)^3$, $(-4)^3$, $(-3)^3$ and $(-2)^3 = -125$, -64, -27 and -8.
 5. 6^3 and $8^3 = 216$ and 512 6. 3^3 , 5^3 , 7^3 and $9^3 = 27$, 125, 343 and 729 7. (i) $\frac{64}{125}$
 (ii) $20\frac{51}{64}$ (iii) $15\frac{5}{8}$ (iv) $37\frac{1}{27}$ 8. (i) $-\frac{8}{125}$ (ii) $-2\frac{93}{125}$ (iii) $-11\frac{25}{64}$ (iv) $-37\frac{1}{27}$ 9. (i) 0.001
 (ii) 0.125 (iii) 3.375 (iv) 0.000008 (v) -0.216 (vi) -0.000512 (vii) -0.002744 (viii) -4.096

Exercise 7(F)

1. (i) 3 (ii) 4 (iii) 5 (iv) 3 (v) 0.5 2. (i) 1 (ii) 7 (iii) 8 (iv) 15 3. (i) -1 (ii) -5 (iii) -6 (iv) -8
 4. (i) $\frac{1}{2}$ (ii) $1\frac{1}{2}$ (iii) $1\frac{1}{3}$ (iv) $-\frac{2}{3}$ 5. (i) 0.5 (ii) 0.4 (iii) 0.1 (iv) 1.5 (v) -0.2 (vi) -0.3
 6. (i) $5^2 = 25$ (ii) $3^5 = 243$ (iii) $2^3 \times 3^4 = 648$ (iv) $4^2 \times 3^3 \times 2^4 = 6912$

Revision Exercise (Chapter 7)

1. (i) 1 (ii) 1 (iii) -1 (iv) 5 (v) -5 (vi) -5 (vii) 25 (viii) 25 (ix) -25 (x) 125
 (xi) -125 (xii) -125 2. (i) True (ii) False (iii) False (iv) False (v) True
 (vi) False 4. No. of rows = no. of columns = 18 5. (i) 4 (ii) 14 (iii) 2 6. (i) 0.216
 (ii) -0.216 7. (i) 49 (ii) 52 (iii) 136 (iv) 39 8. (i) 4 (ii) 2 (iii) 4

Exercise 8(A)

1. (a) (i) 2 : 3 (ii) 8 : 9 (iii) 4 : 5 (b) (i) 25 : 4 (ii) 3 : 20 (iii) 10 : 3 (iv) 8 : 3
 (v) 4 : 3 (vi) 16 : 3 (c) (i) 3 : 5 (ii) 1 : 2 (iii) 28 : 42 : 15 (iv) x : 4 (v) 5 : 3 (vi) 1 : 2
 2. 3 : 4 3. (i) 24 : 17 (ii) 17 : 7 (iii) 7 : 24 4. (i) 6 : 7 (ii) 7 : 13 (iii) 13 : 6
 5. (i) 1 : 2 (ii) 2 : 3 (iii) 3 : 1 6. (i) 2 : 3 (ii) 4 : 7 (iii) 8 : 13 (iv) 5 : 3 (v) 2 : 1

Exercise 8(B)

1. Hari = ₹ 75; Gopi = ₹ 45 2. 45 and 27 3. 18, 27 and 36
 4. ₹ 4,800, ₹ 3,200 and ₹ 2,400 5. ₹ 600, ₹ 900 and ₹ 1,000 6. 80° and 30°
 7. 9 cm, 6 cm and 12 cm 8. 10 kg 9. A = ₹ 18,000, B = ₹ 9,000 and C = ₹ 4,500
 10. Ashok = ₹ 60,000; Mohit = ₹ 15,000 and Geeta = ₹ 6,000

Exercise 8(C)

1. (i) No (ii) Yes (iii) Yes (iv) Yes (v) Yes (vi) Yes 2. (i) 3 (ii) 18 (iii) 12
 (iv) 20 (v) 12 (vi) 9 3. (i) 4 (ii) 2 (iii) 5 (iv) 12 (v) 6 (vi) 90 4. 25 5. 27
 6. 48 7. 100 m 8. ₹ 80 9. 10.8 kg 10. (i) 90 (ii) 315

Revision Exercise (Chapter 8)

1. 7 : 6 2. (i) ₹ 130 (ii) ₹ 160 (iii) 13 : 16 3. (i) 41 : 35 (ii) 35 : 6 (iii) 6 : 41
 4. ₹ 600 and ₹ 850 5. (i) Yes (ii) No 6. (i) 25 (ii) 270 7. ₹ 1,600 8. 28 cm
 9. 15 years 10. A = ₹ 3,500; B = ₹ 4,200 and C = ₹ 2,800

Exercise 9(A)

1. (i) 65% (ii) 70% are good 2. (i) 1.5% (ii) $83\frac{1}{3}\%$ (iii) $81\frac{1}{4}\% = 81.25\%$ (iv) $66\frac{2}{3}\%$
 3. (i) 10% (ii) 2% (iii) 70% (iv) 15% (v) 3.2% 4. (i) $\frac{2}{25}$ (ii) $\frac{1}{5}$ (iii) $\frac{17}{20}$ (iv) $\frac{5}{2} = 2\frac{1}{2}$
 (vi) $\frac{1}{8}$ 5. (i) 0.25 (ii) 1.08 (iii) 0.95 (iv) 0.045 (v) 0.292 6. (i) 700% (ii) 200%
 (iii) 1950% (iv) 537%

Exercise 9(B)

1. (i) 20% (ii) 20% (iii) 25% (iv) 20% 2. (i) 20% (ii) $8\frac{1}{3}\%$ (iii) $11\frac{2}{3}\%$ 3. (i) ₹ 30
 (ii) 117 (iii) 0.3 min = 18 sec (iv) 37.5 kg 4. 30% 5. $81\frac{1}{4}\% = 81.25\%$ 6. 76% 7. 85%
 8. 11 kg 9. Arithmetic (92.86%); $92\frac{6}{7}\%$; 80% 10. 12% 11. 25% 12. (i) 80% (ii) 20%
 13. ₹ 26,880 14. (i) ₹ 540 (ii) ₹ 1,260 15. (i) 0 (ii) ₹ 25

Exercise 9(C)

1. 20% 2. 12.5% 3. 25% 4. (i) ₹ 368 (ii) 26.25 km (iii) 675 km/h (iv) ₹ 64,062.50
 5. 22,000 6. Food = ₹ 4,500; House rent = ₹ 1,800 and on both = ₹ 6,300
 7. 10 litres 8. 25,600 9. 39.2 kg 10. (i) 20% (ii) 80% 11. (i) 22.5 kg (ii) 104.4 kg

Revision Exercise (Chapter 9)

1. (i) 80% (ii) 125% 2. (i) 40% (ii) 60% (iii) 150% 3. 70% 4. 13 kg 5. (i) 75%
 (ii) 70% (iii) 70% (iv) 2500 (v) 1775 (vi) 71% 6. 30% 7. 20% 8. (i) 25% (ii) 20%
 9. (i) ₹ 7,776 (ii) ₹ 7,980 10. (i) 50% increase (ii) 20% decrease (iii) 10% decrease
 11. (i) ₹ 832 (ii) ₹ 512 12. (i) 72 (ii) 49 13. (i) 15 (ii) -14 14. (i) 2.7%
 (ii) 8,00,000 m³ 15. Nitrogen = 624 m³, Oxygen = 168 m³ and others = 8 m³

Exercise 10(A)

1. ₹ 1.20 2. ₹ 64.50 3. ₹ 471.50 4. ₹ 4,388 5. ₹ 20,475 6. (i) ₹ 12
 (ii) ₹ 15 (iii) ₹ 3 (profit) (iv) ₹ 150 (gained) 7. (i) ₹ 1.50 (ii) ₹ 0.50 (iii) ₹ 150
 8. (i) ₹ 0.80 (ii) ₹ 0.20 (iii) ₹ 50 9. Gain = ₹ 38 10. (i) ₹ 1,600 (ii) Loss = ₹ 60
 11. (i) ₹ 9,650 (ii) Profit = ₹ 850

Exercise 10(B)

1. (i) 12% gain (ii) 25% loss (iii) 20% gain (iv) $16\frac{2}{3}\%$ loss (v) 20% gain (vi) 10% loss
 2. (i) ₹ 132 (ii) ₹ 296 3. ₹ 45 4. 10% 5. (i) ₹ 480 (ii) 10 dozen (iii) ₹ 600 (iv) ₹ 120 (profit)
 (v) 25% profit 6. 15% 7. ₹ 7,000; ₹ 8,120 8. (i) ₹ 1.25 (ii) Profit = ₹ 0.25 (iii) 20% (iv) ₹ 6

(v) ₹ 1 profit (vi) 20% (vii) Yes [Whether we find profit percent or loss percent on selling one article or on selling all the articles; the profit percent or loss percent will always remain the same]. 9. (i) ₹ 24 (ii) ₹ 30 (iii) Profit = ₹ 6 (iv) 25% profit 10. (i) 20% (ii) CP = ₹ 200 and SP = ₹ 160 (iii) ₹ 40 11. (i) ₹ 240 (ii) ₹ 400 (iii) ₹ 800 (iv) ₹ 4,000

Exercise 10(C)

1. Profit = ₹ 265 2. ₹ 2,385 3. Profit = ₹ 293.50; 10% 4. ₹ 300; 5% 5. $33\frac{1}{3}\%$
6. ₹ 450; ₹ 2,550 7. ₹ 220.80 8. ₹ 132 9. ₹ 396; $29\frac{1}{3}\%$

Revision Exercise (Chapter 10)

1. ₹ 900; 20% 2. ₹ 1,500; loss = 10% 3. (i) ₹ 615 (ii) ₹ 1,710 (iii) ₹ 300 (iv) ₹ 444
4. (i) ₹ 900 (ii) ₹ 225 5. (i) ₹ 1,170 (ii) ₹ 1,500 (iii) ₹ 2,670 (iv) ₹ 2,500 (v) Profit = ₹ 170
(vi) 6.8% profit 6. (i) ₹ 2,000 (ii) ₹ 2,100 (iii) 5% profit 7. (i) Profit = ₹ 900 (ii) 15% profit
8. (i) Loss = ₹ 500 (ii) 20% loss 9. (i) ₹ 330 (ii) ₹ 1,320 10. (i) ₹ 1,500 (ii) 20%.

Exercise 11(A)

1. (i) ₹ 36 (ii) ₹ 108 (iii) ₹ 200 (iv) ₹ 184 (v) ₹ 882 2. (i) ₹ 1,200 (ii) ₹ 5,200
3. ₹ 4,680 4. (i) John = ₹ 3,600 (ii) Rahul = ₹ 3,750 (iii) John = ₹ 18,600 and Rahul = ₹ 28,750
(iv) ₹ 150 (v) ₹ 10,150 5. ₹ 1,164; (i) ₹ 3,950 (ii) ₹ 5,114

Exercise 11(B)

1. (i) ₹ 300 (ii) ₹ 2,125 2. (i) ₹ 570 (ii) ₹ 2,000 3. (i) 3% (ii) 5% 4. (i) 10% (ii) 20%
5. (i) 3 years (ii) 10 years 6. (i) 4 years (ii) 15 years 7. 40% 8. 5 years

Revision Exercise (Chapter 11)

1. ₹ 16,000 2. ₹ 7,500 3. 9% 4. 8% 5. 4 years; ₹ 19,600 6. 7 years 7. 25% 8. ₹ 6,700
9. ₹ 3,600 10. (i) ₹ 4,320 (ii) 12% (iii) 12% (iv) ₹ 7,200 (v) ₹ 19,200 11. (i) ₹ 1,120 (ii) 8%
(iii) ₹ 11,200 12. (i) ₹ 3,780 (ii) 6% (iii) $3\frac{1}{3}$ years = 3 years 4 months 13. ₹ 20,000
15. $7\frac{1}{2}$ years = 7 years 6 months

Exercise 12(A)

1. (i) $8 + x = y$ (ii) $x - 5 = y$ (iii) $2 + x > y$ (iv) $x + y < 24$ (v) $15 \times m = 3n$
(vi) $8 \times y = 3x$ (vii) $30 \div b = p$ (viii) $z - 3x = y$ (ix) $12 \times x = 5z$ (x) $12 \times x > 5z$
(xi) $12 \times x < 5z$ (xii) $45 - 3z = y$ (xiii) $8x \div y = 2z$ (xiv) $5x - 7y = 8z$ (xv) $7y - 5x = 8z$
2. (i) $3x$ plus 8 is equal to 15 (ii) 7 decreased by y is greater than x
(iii) $2y$ decreased by x is less than 12 (iv) 5 divided by z is equal to 5
(v) a increased by $2b$ is greater than 18 (vi) $2x$ decreased by $3y$ is equal to 16
(vii) $3a$ decreased by $4b$ is greater than 14 (viii) b increased by $7a$ is less than 21
(ix) The sum of 16 and $2a$ decreased by x is greater than 25
(x) The sum of $3x$ and 12 decreased by y is less than $3a$.

Exercise 12(B)

1. 6 , $\frac{5}{4}$ and 0 are constants. $4y$, $-3x$, $\frac{4}{5}xy$, az , $7p$, $\frac{9x}{y}$, $\frac{3}{4x}$ and $-\frac{xz}{3y}$ are variables
2. (i) $4x$, $-x$, $\frac{2}{3}x$ and $-3y$, $\frac{4}{5}y$, y (ii) $\frac{2}{3}xy$, $-4yx$, yx and $2yz$, $-\frac{2}{3}yz$ and $\frac{zy}{3}$ (iii) $-ab^2$, $7b^2a$, $2ab^2$ and b^2a^2 , $-3a^2b^2$ (iv) $5ax$, $7xa$, $\frac{2ax}{3}$ and $-5by$, $\frac{by}{7}$
3. (i) True (ii) False (iii) True (iv) False (v) True (vi) False (vii) True (viii) True (ix) True (x) False (xi) True (xii) False
4. (i) 2 (ii) 2 (iii) 2 (iv) 2 (v) 3 (vi) 1 (vii) 2 (viii) 3 (ix) 3
5. (i) True (ii) False (iii) True (iv) False (v) False (vi) True
6. (i) Monomial (ii) Binomial (iii) Monomial (iv) Monomial (v) Trinomial (vi) Binomial (vii) Trinomial (viii) Binomial (ix) Trinomial
7. (i) 1 (ii) -1 (iii) -3 (iv) $-5a$ (v) $\frac{3}{2}y$ (vi) $\frac{a}{y}$
8. (i) $-3y^2$ (ii) $-a$ (iii) -1 (iv) $\frac{2}{a}$ (v) $-2z$ (vi) $-y^2$ (vii) $-3a$ (viii) $5a$
9. (i) 5 (ii) 1 (iii) 5 (iv) -2 (v) $\frac{2}{3}$ (vi) $-\frac{15}{2}$ (vii) -7 (viii) $-\frac{3}{2}$
10. (i) 2 (ii) 2 (iii) 10 (iv) 20 (v) 3 (vi) 7 (vii) 6 (viii) 9

Exercise 12(C)

1. (i) $3x + 4y = 8$ (ii) $5x - 7 = y$ (iii) $4x + 37 = 6x$ (iv) $89 - 3x = 44$
2. (i) $7y$, $-8y$ and $3x$, $-x$, $\frac{x}{5}$ (ii) $3x^2$, $-x^2$, $5x^2$ and $-5x^3$, $8x^3$ (iii) x^2y^3 , $-4x^2y^3$, $-x^2y^3$ and $-5x^3y^2$, $8x^3y^2$
3. (i) 2 (ii) 3 (iii) 3 (iv) 4 (v) 3
4. (i) binomial (ii) binomial (iii) trinomial (iv) binomial (v) monomial (vi) monomial
5. (i) $-7z$ (ii) $8ab$ (iii) -1
6. (i) $-8y$ (ii) -4 (iii) $-y^2$
7. (i) 7 (ii) $\frac{2}{3}$ (iii) $-\frac{5}{4}$
8. (i) 8 (ii) 4 (iii) 2 (iv) 1 (v) 3 (vi) 6 (vii) 7 (viii) 6 (ix) 100
9. (i) $2x + 28 = 45$ (ii) $3y - 5z > 8x$ (iii) $\frac{6x}{13y} < 17$ (iv) $9 \times 5x = 2y$
10. (i) False (ii) True (iii) True (iv) True

Exercise 13(A)

1. (i) 9 and $9x$ (ii) 30 and $30x^2y$ (iii) 23 and $7a + 16b$ (iv) 4 and $x^2y + 3xy^2$ (v) 3 and $3ab$ (vi) 7 and $12x - 5y$ (vii) 19 and $19ab$ (viii) 15 and $28ax^2 - 13a^2x$
2. (i) -7 and $-7x$ (ii) 5 and $5ab$ (iii) -19 and $-15x - 4y$ (iv) 26 and $18x + 8y$ (v) 18 and $18ab$ (vi) 9 and $9xy$ (vii) -15 and $-10ax - 5ay$
3. (i) $11xy$ (ii) $9xyz$ (iii) $5a + 4b$ (iv) $3x + 2y$ (v) $5m + 3n + 4p$ (vi) $9a + 9ab$ (vii) $3p + 13q$ (viii) $9ab + 6b$ (ix) $80pq + 10pr$ (x) $-6y$ (xi) $-4b$ (xii) $-9b$ (xiii) $-8c$
4. (i) $-2a$ (ii) $2b$ (iii) $4x$ (iv) $2ab$ (v) $5x + 5y$
5. (i) $2x$ (ii) ab (iii) $8a$ (iv) $10abc$
6. (i) $2x$ (ii) $3\frac{1}{3}b$ (iii) $8\frac{3}{5}ax$ (iv) $3\frac{1}{2}y$ (v) $2\frac{1}{6}xy$
7. (i) $2ab$ (ii) $2b$ (iii) $7abc$ (iv) $5mn$
8. (i) $10a^2b^2 + 2ab^2$ (ii) $2a + 2b$ (iii) $xy + 7yz$ (iv) $3ab$ (v) $4a^2 + 2b^2$ (vi) $4abc + 3ab$ (vii) $12xyz$ (viii) $12pqr + 2p + 4q$ (ix) $2ab$ (x) $11x^2y - 3xy^2$ (xi) $4a + 3.1b$ (xii) $3.7a + b$ (xiii) $22m + 3\frac{1}{2}n - 15p$ (xiv) $4\frac{1}{2}p + 3q$ (xv) 0

Exercise 13(B)

1. (i) $2a + 5b - 3c$ (ii) $4x^2 - 7xy + 6y^2$ (iii) $-x^2 - 2x$ (iv) $2a^2 + 2ab - bc$ (v) $x^2 + 5 + 6x$ (vi) $5x + 4xy + 4y^2$
2. (i) $11x^2 + xy + 17y^2$ (ii) $4x^2 - 5xy - y^2 + 3$ (iii) $3a^3 + b^3 - 4a - b$

3. (i) $2a - 2b$ (ii) $4x - 4y$ (iii) $15a + 12b$ (iv) $11x + 3y$ (v) $12 - 4a$ (vi) $13y - 17$
 4. (i) $-4a - b - 4c$ (ii) $8x + 13y - 24z$ (iii) $6a - 3b - 2c - 5$ (iv) $9x + 11y - 18z$
 (v) $-ab - 3cd + 3ac + 3bd$ 5. (i) $2ab$ (ii) $-2x - y - z$ (iii) $2p - \frac{4}{3}q - \frac{1}{2}r$ (iv) $2a$ 6. (i) $2x$
 (ii) $5x$ (iii) $a + 2b$ (iv) $6x$ (v) $x + 3y$ (vi) $-a + 2b - 3c$ 7. $2x - y - 2z$ 8. $2a + 2b + 3c$
 9. $3x + 2y - z$ 10. 0 11. $2x - 2y + 3z$ 12. $2x^2 - 4xy - 2y^2$ 13. $a^2 + 2ab - 4b^2$

Exercise 13(C)

1. (i) 18 and $18x^2$ (ii) 18 and $18x^5$ (iii) 20 and $20xy$ (iv) 28 and $28ax^2$
 (v) 12 and $12x^2y^2$ (vi) 48 and $48a^2x^3$ (vii) 8 and $8a^5x^3y^3$ (viii) 45 and $45x^6y^2$
 2. (i) $48x^2$ (ii) $18a^2bx$ (iii) $6x^6$ (iv) $25a^3$ (v) $216x^4y^2$ (vi) $24x^2$ (vii) $75x^3$
 (viii) $-96x^4y^4$ (ix) $-60x^2yz$ (x) $-140x^6y^6$ 3. (i) $15x^7$ (ii) $35a^9$ (iii) $18a^2bc^4$
 (iv) $5a^5b^6$ (v) $10x^5y^7$ (vi) ab^2c^2d 4. (i) $a^2b + ab^2$ (ii) $9a^2b^2 - 12ab^2$
 (iii) $8bx^2y - 20b^2xy$ (iv) $12x^2y + 6xy^2$ (v) $2x^3 - 2x^2$ (vi) $x + 4x^2$
 (vii) $45x^2y^3 + 15x^3y^2$ (viii) $18ax^2y - 15axy^2$ 5. (i) $2x^2 - 2xy + 2xz$
 (ii) $x^3y^2z^2 - x^2y^2z^3$ (iii) $-4xy^3z^2 - 6xy^3z$ (iv) $3x^2y^3 - 4x^3y^2$ (v) $-4x^3y^2 - 12x^3y^3$
 6. (i) $9a^2 + 12ab - 15ac$ (ii) $5x^2y^3 + 30x^3y^2$ 7. (i) $x^2 + 12x + 20$ (ii) $x^2 + 2x - 15$
 (iii) $x^2 - 2x - 15$ (iv) $x^2 - 8x + 15$ (v) $2x^2 + 7xy + 3y^2$ (vi) $3x^2 + 13xy - 30y^2$
 (vii) $x^2 + 4xy - 45y^2$ (viii) $4x^2 + 20xy + 25y^2$ 8. (i) $-15a^3b^3c^2$ (ii) $-2x^2 + 2xy - 2xz$
 (iii) $-4xy + 6y^2 + 10yz$ (iv) $-8x^2y^2z^2 + 10x^3y^2z^4$ (v) $-13x^2y^3z^2 + 15x^3y^2z^2 - 6x^2y^2z^3$
 (vi) $-8a^2b^2c^3 + 10a^3b^2c^3 + 12a^2b^3c^3$ 9. (i) $x^2y^2 - a^2b^2$ (ii) $4a^2b^2c^2 - 9x^2y^2$
 (iii) $2a^2 - ab - 2ac - 3b^2 + 3bc$ (iv) $10x^2 + 3xy - 14xz - 18y^2 - 21yz$
 (v) $10x^2 + 3xy - 9zx - 18y^2 - 27yz - 7z^2$ (vi) $2a^2 + ab - 6ac - 3b^2 + bc + 4c^2$

Exercise 13(D)

1. (i) $9x$ (ii) $21m$ (iii) $8ab$ (iv) $1\frac{2}{7}xy$ (v) $-\frac{1}{2}xy$ (vi) $-\frac{1}{2}m^3n$ (vii) $1\frac{1}{3}a^4m^2$ (viii) 0 (ix) 0
 (x) $-1\frac{4}{5}m^9y^9$ (xi) $\frac{16}{19}x^6y^4$ 2. (i) $15x^6$ (ii) $64m^7$ (iii) 0 (iv) 0 (v) $-30m^3n^3$ (vi) $14a^3b^3$
 (vii) $30x^3$ (viii) $-4a^3b^3$ (ix) x^3y^3 3. (i) $-10m^3n^5 - 26m^4n^3 + 4m^5n^2$ (ii) $2a^2x^3 - 6abx^4 - 10acx^5$
 4. (i) $-9a^3x^2y^2$ (ii) $2x^4y^3$ (iii) $2b^3c^3x^4$ (iv) $2a^4b^3x$ (v) $-30a^4b^5$ (vi) $40x^{10}$ (vii) x^8y^6

Exercise 13(E)

1. (i) 3 (ii) 5 (iii) $4m$ (iv) $4x$ (v) 3 (vi) $7ab^3$ (vii) $6r^2$ (viii) $\frac{2}{b}$ 2. (i) $2x^3$ (ii) $2a^5$ (iii) -4
 (iv) $-4abc^2$ (v) $-\frac{5x}{y}$ (vi) $4q^3r^5$ (vii) $-16xy$ (viii) $\frac{5y}{x}$ 3. (i) $-\frac{3}{8}$ (ii) $3q$ (iii) $-\frac{3}{2}m^3n^5$
 (iv) $9ax^3y^4$ (v) $\frac{4x^2a^6}{y}$ (vi) $\frac{7ab^2}{c^3}$ (vii) $\frac{4a^3}{27b^3}$ (viii) $-\frac{x}{2} = -0.5x$ (ix) $\frac{8xy}{z}$ 4. (i) $5n^2$
 (ii) $-\frac{7x^2}{3}$ (iii) $-4y$ 5. (i) $3x^2 - 2x$ (ii) $-3m + 8m^2 - 5m^3$ (iii) $3x + 5y - \frac{36}{5}x^2y^2$

Revision Exercise (Chapter 13)

1. (i) $2xy$ (ii) $7a + 7b$ (iii) $4a - y + b + c$ (iv) $a^2 + b^2$ 2. (i) $4x^2 + 6y^2 - 2xy$
 (ii) $-5a^2 + 6b^2 + 8ab$ 3. $8x - 3y + 12z$ 4. $a - 17b + c$ 5. $-2x - 2y - 2z^2$ 6. (i) $4x - 8y$
 (ii) $12a + 10b$ 7. (i) $4a^2 - 9b^2$ (ii) $10x^2 - 15xy + 20xz$ (iii) $15a^2 - 19ab - 56b^2$
 (iv) $15a^2 + 19ab - 56b^2$ 8. (i) $-8ab$ (ii) $-4xyz^2$ (iii) $3a^2b^3$ (iv) $5x^3 - 7x^4 + 6x^2$

- (v) $-3xy - 5x^2 + 7y^2$ 9. (i) $4y$ (ii) $-4y$ (iii) $-4y$ (iv) $4y$ (v) $12x^3y^2 + 6x^2y^3$ (vi) $2a^4b^3 - 6a^3b^5$
 10. (i) $15x^3y^4$ (ii) $-15x^4y^5$ (iii) $-15x^7y^5$ (iv) $15x^7y^8$ (v) $-xy^3$ (vi) -4 11. (i) $-13ab$ (ii) $2xy$
 (iii) $3x^2y$ (iv) $3x - 5y$ (v) $-3m - 23n$ 12. $-2m^2 + 3n^2 - 6mn$ 13. $4x^3 + 8x^2 - 8x + 13$
 14. (i) $10x^2yz + 6xyz^2$ (ii) $5x^3y^2 + 4x^3y^3$ (iii) $-10x^5 + 15x^4 - 30x^3 + 40x^2$
 15. (i) $12x^3 + 7x^2 + 10x + 24$ (ii) 0 (iii) $2a^3b - ab^4 - 12a^2b^3 + 5a^3b^2 - 10a^3b^3$

Exercise 14(A)

1. (ii) 3 (iii) 2 (iv) 4 (v) 6 (vi) 0 (vii) 0 (viii) 22 (ix) 13 (x) 26 (xi) 0 (xii) 8
 (xiii) 1 (xiv) 18 (xv) 54 2. (i) 17 (ii) 150 (iii) 4 (iv) 6 (v) 4 (vi) 63 3. (i) 60
 (ii) 2 (iii) 1 4. (i) 1 (ii) 8 (iii) -1 (iv) 6 (v) -3 (vi) 6 (vii) 29 5. 16 6. -18
 8. (i) True (ii) False (iii) True 9. (i) $\frac{1}{4}$ (ii) $\frac{2}{5}$ (iii) 16 (iv) 25 (v) 200 (vi) 4000
 (vii) $\frac{1}{10}$ (viii) 50 10. (i) $a^2 = 9$ and $2^a = 8$ 11. 16

Exercise 14(B)

1. (i) 12 (ii) $15x$ (iii) $3m$ (iv) $10a$ (v) $10b$ (vi) $6y$ 2. (i) $5x$ (ii) $10m - 4n$ (iii) $-3b$
 (iv) $12a$ (v) x (vi) $-s$ (vii) $a + b - c - d - e + f$ (viii) 0 (ix) $b + c$ (x) $6a^2 + b^2$
 (xi) $4n - m$ (xii) $-m - n$ (xiii) x (xiv) $38y - 11x$ (xv) $4x - 2$ (xvi) $6a$
 (xvii) $6x^2 - 3x - 4$ (xviii) $2x - y$ 3. (i) $x + y - z$ (ii) x (iii) $10x - 15y$
 (iv) $a + 13b$ (v) $2q - 2r - p$ (vi) $b - c$ (vii) $x + 21y$ (viii) $5a^2 - 10a$

Exercise 14(C)

1. (i) $2a + (b - c)$ (ii) $3x - (z - y)$ (iii) $6p - (5x - q)$ (iv) $a + (b - c + d)$
 (v) $4x - (2c - 5a - 4b)$ (vi) $-3 + 4y + (7x + 2z)$ (vii) $6 - (2n - 3m)$ (viii) $2t + r - (p + q - s)$
 2. (i) $-(-x + 2y) = -(2y - x)$ (ii) $-(-m - n + p) = -(p - m - n)$ (iii) $a + (4b - 4c)$
 (iv) $a - (3b - 5c)$ (v) $x^2 - (y^2 - z^2)$ (vi) $-(-m^2 - x^2 + p^2) = -(p^2 - m^2 - x^2)$
 (vii) $2z - (-2x + y) = 2z - (y - 2x)$ (viii) $2bc - (-ab + 3ac) = 2bc - (3ac - ab)$

Revision Exercise (Chapter 14)

1. 270 2. 8 3. (i) 9 (ii) 8 (iii) 7 (iv) 9 (v) 1 (vi) -2 4. (i) $-19x^2 - 16xy + 3y^2$
 (ii) $-5x^2 - 4xy + 7y^2$ (iii) $-14x^2 - 14xy + 7y^2$ (iv) $-2xy + 11y^2$ 5. (i) $a^3 + b^3 + c^3 - 3abc$
 (ii) $ab^2 - a^2c - a^2b + b^2c + c^3 - abc$ 6. (i) $4x^2 - 7xy - 2y^2$; 0 (ii) $x^3y - x^2y^2 - xy^2 + y^3$; 2
 (iii) $x^2 - 2zx - 2xy + 6yz - 3z^2$; -5 7. (i) $-x + 23y$ (ii) $-37x + 80$ (iii) $-222x + 480$
 (iv) $225x - 480$ (v) $8x^2 - 3x - 19$ (vi) $7x - 3$ (vii) $15x^2 - 7x + 15$ 8. 3

Exercise 15(A)

1. (i) $x = 4$ (ii) $x = -4$ (iii) $y = -3$ (iv) $x = -7$ (v) $y = -10$ (vi) $b = 1.7$ (vii) $p = 3.9$
 (viii) $y = -9.7$ (ix) $a = -21.5$ (x) $x = 2\frac{2}{3}$ (xi) $z = 2\frac{1}{5}$ (xii) $m = \frac{3}{4}$ (xiii) $x = -\frac{3}{4}$ (xiv) $y = -1\frac{1}{3}$
 (xv) $a = -1\frac{7}{10}$ 2. (i) $x = 5$ (ii) $m = -3$ (iii) $b = 12$ (iv) $a = -1.5$ (v) $y = 9\frac{1}{2}$ (vi) $z = -3\frac{2}{3}$
 (vii) $p = 8.1$ (viii) $x = -3.4$ (ix) $n = -\frac{1}{5} = -0.2$ 3. (i) $x = 4$ (ii) $y = 4\frac{1}{2} = 4.5$ (iii) $z = 1.7$

- (iv) $m = 3$ (v) $p = 5$ (vi) $a = 2.3$ 4. (i) $x = 10$ (ii) $y = -6$ (iii) $a = -75$ (iv) $z = 13$ (v) $m = 15$
 (vi) $n = -19.6$ 5. (i) $x = -4$ (ii) $y = -4$ (iii) $z = -\frac{4}{5} = -0.8$ (iv) $a = -8$ (v) $p = -3$ (vi) $m = 7.2$
 (vii) $x = 5\frac{11}{15}$ (viii) $m = 1\frac{3}{7}$ (ix) $y = 1\frac{4}{5}$

Exercise 15(B)

1. (i) $x = 6$ (ii) $y = 1$ (iii) $p = 5$ (iv) $a = -6$ (v) $z = -11$ (vi) $m = 3$ (vii) $x = 3$ (viii) $m = -1.1$
 (ix) $y = -1.4$ 2. (i) $x = 21$ (ii) $y = 22$ (iii) $z = 10\frac{1}{2}$ (iv) $a = 17.76$ (v) $b = -8.8$
 (vi) $m = 6$ 3. (i) $m = 1$ (ii) $x = 1\frac{1}{3}$ (iii) $x = 1$ (iv) $x = 2$ (v) $a = 3$ (vi) $x = 5$
 (vii) $x = 5\frac{1}{5}$ (viii) $x = 1$ (ix) $m = 5\frac{1}{2}$ (x) $x = -1\frac{1}{4}$

Exercise 15(C)

1. $x = 2$ 2. $y = -6$ 3. $x = 10.4$ 4. $x = \frac{4}{5}$ 5. $y = 5\frac{5}{6}$ 6. $z = 3\frac{1}{6}$ 7. $z = 5$ 8. $a = -0.7$
 9. $z = -6$ 10. $z = -10$ 11. $x = -2$ 12. $z = -2$ 13. $y = -3$ 14. $x = 1.7$ 15. $y = 2.7$
 16. $x = -1.4$ 17. $y = 12$ 18. $z = -12$ 19. $x = -18.8$ 20. $y = -4$ 21. $z = 1.6$ 22. $x = 5$
 23. $y = 2$ 24. 1 25. 5 26. 3 27. 2

Exercise 15(D)

1. 37 2. 34 3. 252 4. 160 5. 7 6. 28 7. Son = 10 years and father = 37 years
 8. Gopal = 15 years, father = 41 years 9. 15 and 16 10. 21, 22 and 23

Revision Exercise (Chapter 15)

1. (i) 2 (ii) 5 (iii) $10\frac{1}{2}$ (iv) 7 (v) $1\frac{2}{3}$ (vi) $34\frac{2}{3}$ (vii) $8\frac{1}{2}$ (viii) 15 (ix) $1\frac{1}{12}$ (x) 1.46 (xi) -0.5
 (xii) -0.5 (xiii) 16 (xiv) -15 (xv) 13 (xvi) -2 (xvii) 8 (xviii) -5 (xix) 0.4 (xx) -2
 (xxi) 5 (xxii) 8.4 (xxiii) 3.6 (xxiv) -1.26 (xxv) 3 (xxvi) 3 (xxvii) -3 (xxviii) $7\frac{5}{6}$
 (xxix) $\frac{9}{10}$ (xxx) $2\frac{11}{12}$ (xxxi) 4 (xxxii) 6 (xxxiii) -7 (xxxiv) -6 (xxxv) $6\frac{6}{7}$
 (xxxvi) $1\frac{7}{10}$ 2. 19 3. 36 4. 2 5. 32 years 6. 9 years 7. 21 8. (i) $x + 15$ (ii) 43
 9. (i) $x - 23$ (ii) 34 10. 25, 26 and 27 11. (i) $x - 1$, x and $x + 1$ (ii) 17, 18 and 19.

Exercise 16(A)

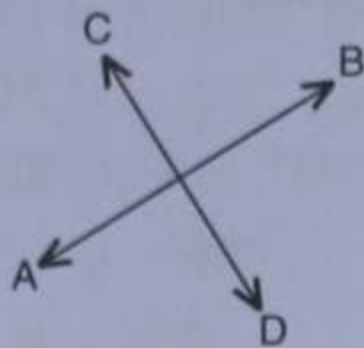
1. (i) False; a dot has no length and no width (ii) True (iii) False; a line segment PQ is just written as PQ (iv) True (v) False; three points are said to be collinear if they lie in the same straight line (vi) True
 2. (i) Infinite (ii) Only one (iii) Only one (iv) None 3. (a) (i) A, B and C (ii) A, D and C
 (iii) AC and DC (b) (i) true (ii) true (iii) false (iv) false
 4. (i) A ray can be extended infinitely on only one side of it (ii) A ray has indefinite length
 (iii) Correct (iv) A line segment has two end-points or a line has no end-point (v) Correct
 5. (i) False; a line has an infinite number of points on it (ii) False; an infinite number of lines can pass through a given point (iii) True
 6. (i) Intersecting (ii) Parallel (iii) Parallel (iv) Intersecting

7. (i) Tip of your pencil and tip of a nail (ii) Lines printed on your note-book and edge of your table-top (iii) Top of your study table and a wall of your class-room (iv) Surface of a cricket-ball and surface of your pen.

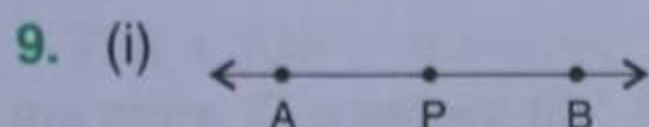
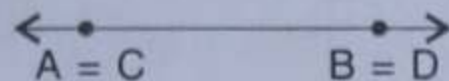
8. (i) When lines are parallel to each other



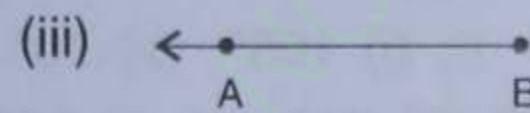
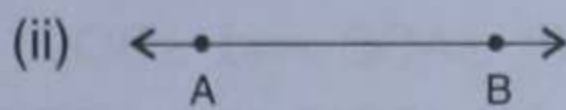
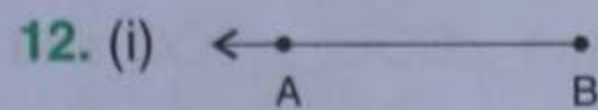
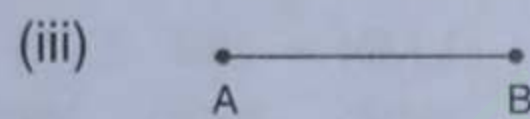
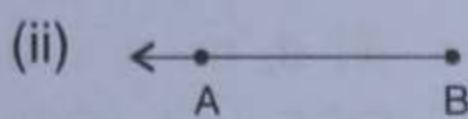
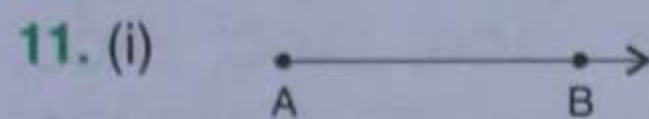
- (ii) The lines intersect



- (iii) Lines coincide



10. (i) only one (ii) Infinite (iii) Infinite



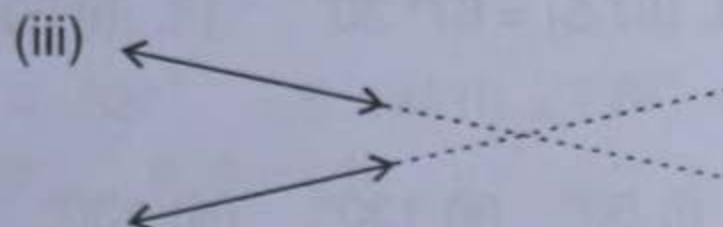
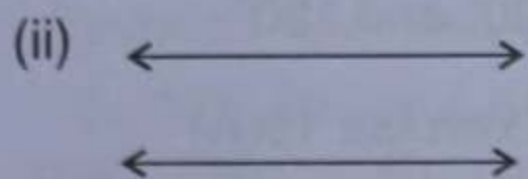
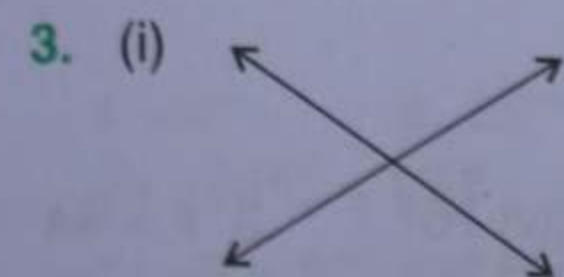
Exercise 16(B)

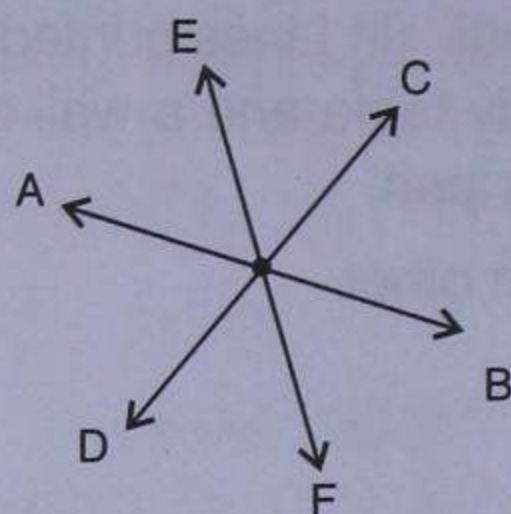
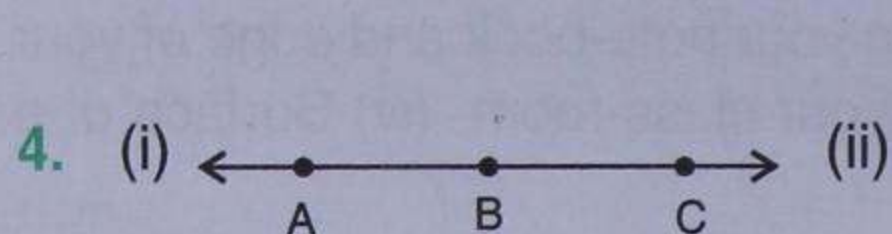
1. (i), (iii), (iv), (vi) and (viii) 2. (i) Triangle (ii) any curved line (iii) four; closed figure (iv) parallel (also equal); perpendicular (v) equal ; 90° (vi) 90° (vii) bisecting ; 90° ; perpendicular (viii) Infinite (ix) Only one (x) mid-point 3. CD and MN 4. (i) and (iii) 5. (i) AB of CD (ii) AB of MN (iii) PQ of RS and RS of PQ *i.e.*, PQ and RS are perpendicular bisectors of each other (iv) None (v) None 6. Your class-room, your text-book and your note-book 7. (i) $l \parallel m$ and $p \parallel q$ (ii) p and l , p and m , q and l and q and m (iii) No (iv) Yes 8. Parallel 9. (i) 18 (ii) 24 (three at each corner) 10. (i) Edges of your book through any corner of it (ii) Opposite edges of your book (iii) Adjacent edges at each end of your book 11. (i) False; only one line passes through three collinear points (ii) False; no line passes through all the three non-collinear points (iii) True (iv) True (v) True (vi) True (vii) True (viii) True (ix) True

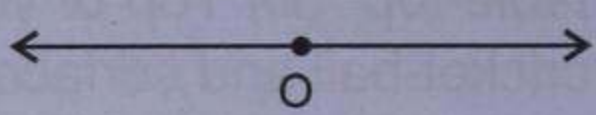
Revision Exercise (Chapter 16)

1. Infinite. Through each point in a plane, an infinite number of lines can be drawn.
2. It is observed that one more separate line cannot be drawn through points A and B.

Statement : One and only one line can be drawn through two fixed points.

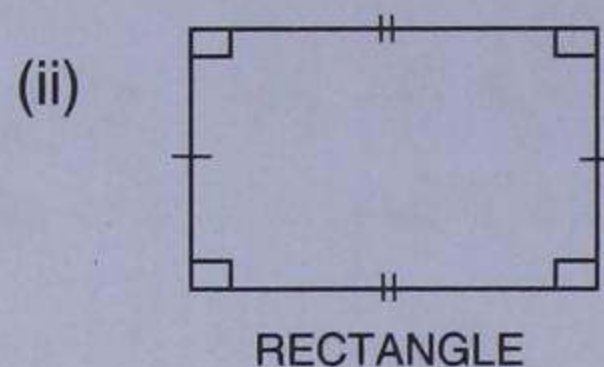
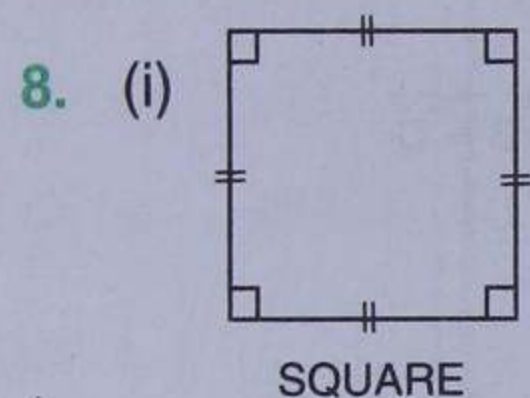




5.  ; line.

6. (i) 10 (ii) 12 (iii) 13

7. A and B lie on the circumference of the circle.



Exercise 17(A)

1. (i) Vertex = O; arms are OA and OB; angle AOB or $\angle AOB$ or $\angle O$ (ii) Vertex = Q; arms are QP and QR; angle PQR or $\angle PQR$ or $\angle Q$ (iii) Vertex = M; arms are MN and ML; angle NML = $\angle LMN$ = $\angle M$ 2. (i) a, b and x (ii) d, m, n, s and t. 3. $\angle AOB$, $\angle AOC$, $\angle AOD$, $\angle AOE$, $\angle BOC$, $\angle BOD$, $\angle BOE$, $\angle COD$, $\angle COE$ and $\angle DOE$. 4. (i) $37^\circ 43' 35''$ (ii) $82^\circ 54' 11''$ (iii) $84^\circ 20' 30''$ (iv) $108^\circ 17' 4''$ 5. (i) $\angle AOB$ and $\angle BOC$; $\angle BOC$ and $\angle COD$; $\angle COD$ and $\angle DOA$; (ii) $\angle AOB$ and $\angle AOD$ (iii) $\angle BOC$ and $\angle COD$. (iv) reflex $\angle AOB$ and reflex $\angle COD$ 6. (i) 105° (ii) 70° 7. (i) 130° (ii) 65° (iii) 155° (iv) 205° (v) 270° 8. (i) 230° (ii) 160° (iii) 210° 9. (i) 127° (ii) 45° 10. $x = 90^\circ$ (i) 120° (ii) 60° (iii) $\angle AOP$ (iv) $\angle BOP$ 11. $x = 40^\circ$ (i) 90° (ii) 150° (iii) 120° 12. (i) 112° (ii) $\angle AOC$ and $\angle BOD$; $\angle AOD$ and $\angle BOC$ (iii) $\angle AOC$ and $\angle BOC$; $\angle BOC$ and $\angle BOD$; $\angle BOD$ and $\angle DOA$; $\angle DOA$ and $\angle AOC$ (iv) Reflex $\angle BOC = 248^\circ$; Reflex $\angle AOC = 292^\circ$; Reflex $\angle AOD = 248^\circ$; Reflex $\angle BOD = 292^\circ$ 13. (i) 35° and 65° (ii) 52° and 86° (iii) 284° and 246° .

Exercise 17(B)

1. (i) 45° (ii) $(90 - x)^\circ$ (iii) $(100 - x)^\circ$ (iv) $(70 - y)^\circ$ 2. (i) 131° (ii) 69° (iii) $(210 - x)^\circ$ (iv) $(160 - y)^\circ$ 3. (i) 60° (ii) 58° (iii) 62° (iv) 75° 4. (i) 120° (ii) 130° (iii) 120° (iv) 60° 5. (i) 45° (ii) 90° 6. 42° and 48° 7. 70° and 110° 8. 31 9. 32 10. (i) $(90 - x)^\circ$ (ii) $(180 - x)^\circ$ (iii) 45°

Revision Exercise (Chapter 17)

2. (i) 17° (ii) $\left(36\frac{2}{3}\right)^\circ$ (iii) 25° 3. (i) 54° (ii) 36° 4. (i) $\angle a$ and $\angle b$, $\angle b$ and $\angle c$, $\angle c$ and $\angle d$, $\angle d$ and $\angle a$, $\angle l$ and $\angle m$, $\angle m$ and $\angle n$, $\angle n$ and $\angle p$, $\angle p$ and $\angle l$ (ii) $\angle a$ and $\angle c$, $\angle b$ and $\angle d$, $\angle l$ and $\angle n$, $\angle m$ and $\angle p$, 5. (i) 6° (ii) 38° 6. (i) 70° (ii) 75° 7. 48° and 42° 8. 105° and 75° 9. 21 10. (i) 90° (ii) 180° (iii) 90° (iv) 360° ; it can also be taken as 0° 11. (i) $(180 - y)^\circ$ (ii) $(90 - y)^\circ$ (iii) 60° 12. (i) 108° (ii) 116° 13. 105° and 75° 14. $(67.5)^\circ = 67^\circ 30'$ 15. (i) 60° (ii) 30° and 120°

Exercise 18(A)

1. (i) 50° (ii) 130° (iii) 130° 2. (i) 20° (ii) 75° (iii) 105° (iv) 75° 3. $x = 44^\circ$ 4. (i) Yes (ii) Yes (iii) No 5. $x = 35^\circ$ and $\angle APB = 135^\circ$

Exercise 18(B)

1. (a) (i) adjacent angles (ii) alternate exterior angles (iii) interior alternate angles (iv) corresponding angles (v) allied angles (b) (i) alternate interior angles (ii) corresponding angles (iii) alternate exterior angles (iv) corresponding angles (v) allied angles (c) (i) corresponding (ii) alternate exterior (iii) alternate interior (iv) alternate interior (v) alternate exterior (vi) vertically opposite
2. (i) $a = 40^\circ$; $b = 40^\circ$ (ii) $a = 60^\circ$; $b = 120^\circ$ (iii) $a = 110^\circ$; $b = 70^\circ$ (iv) $a = 60^\circ$; $b = 120^\circ$ (v) $a = 72^\circ$; $b = 72^\circ$ (vi) $a = 80^\circ$; $b = 100^\circ$ (vii) $a = 50^\circ$; $b = 130^\circ$ (viii) $a = 118^\circ$; $b = 62^\circ$ (ix) $a = 90^\circ$; $b = 90^\circ$
3. $\angle 2 = 60^\circ$; $\angle 3 = 120^\circ$; $\angle 4 = 60^\circ$; $\angle 5 = 120^\circ$; $\angle 6 = 60^\circ$; $\angle 7 = 120^\circ$ and $\angle 8 = 60^\circ$
4. $x = 80^\circ$; $y = 80^\circ$, $z = 100^\circ$, $p = 80^\circ$; $q = 100^\circ$, $r = 100^\circ$ 5. $x = 60^\circ$; $z = 60^\circ$, $p = 60^\circ$, $q = 120^\circ$, $r = 120^\circ$, $s = 120^\circ$ 6. $x = 115^\circ$, $y = 70^\circ$, $z = 70^\circ$, $w = 115^\circ$
7. $a = 130^\circ$; $b = 150^\circ$; $c = 150^\circ$; $d = 130^\circ$ 8. $x = 105^\circ$, $y = 75^\circ$, $z = 75^\circ$.

Revision Exercise (Chapter 18)

1. (i) $x = 105^\circ$, $y = 15^\circ$ and $z = 60^\circ$ (ii) $x = 75^\circ$, $y = 45^\circ$ and $z = 30^\circ$ 2. (i) $a = 70^\circ$, $b = 60^\circ$ and $c = 50^\circ$ (ii) $a = 45^\circ$, $b = 65^\circ$ and $c = 70^\circ$ 3. (i) $a = 75^\circ$, $b = 65^\circ$ and $c = 40^\circ$ (ii) $a = 63^\circ$, $b = 123^\circ$ and $c = 60^\circ$ 4. No; the corresponding angles will be equal only if the straight lines are parallel. 5. Yes, 6. 90° 7. (i) 40° (ii) 110° (iii) 30°

Exercise 19(A)

4. $PR = 4$ cm and $QR = 4$ cm. Yes, $PR = QR$.

Exercise 19(B)

1. 5.8 cm (approximately) 2. 10 cm 3. Each angle = 60° ; yes, angles obtained on bisecting are equal 4. $MN = 4.3$ cm (approximately)

Revision Exercise (Chapter 19)

2. $\angle BAC = 45^\circ$; $AB = 10.8$ cm (approximately) and $AC = 9.6$ cm (approximately) 3. $BQ = 5$ cm 4. $\angle AOB = 30^\circ$ 5. 5 cm 7. (v) $PA = PB = 7$ cm (vi) Yes.

Exercise 20(A)

1. (i) $z = 38^\circ$ (ii) $a = 95^\circ$; $b = 50^\circ$ (iii) $x = 55^\circ$ 2. (i) No (ii) Yes (iii) No 3. (i) 60 (ii) 36 (iii) 15 4. 20° 5. 56° 6. 40° 7. (i) $x = 80^\circ$ (ii) $x = 65^\circ$; $y = 50^\circ$ (iii) $x = 22^\circ$; $2x = 44^\circ$; $3x = 66^\circ$ 8. (i) Obtuse-angled triangle (ii) Acute angled (iii) Right angled 9. (i) Isosceles triangle (ii) Scalene (iii) Scalene (iv) Equilateral

Exercise 20(B)

3. Yes; $\angle A = \angle C = 72.5^\circ$ (approximately) 4. Yes; each angle is 60° 7. $AB = 4.4$ cm and $BC = 5.4$ cm 8. $\angle C = 60^\circ$ and side $BC = 3.1$ cm 9. $BC = 7$ cm and $AC = 12$ cm 10. $\angle ACB = 90^\circ$; right-angled triangle.

Revision Exercise (Chapter 20)

1. 44° 2. 35° each 3. 36° , 60° and 84° 4. 32° 5. (a) (i) $\angle PBC = 40^\circ$ (ii) $\angle BPC = 100^\circ$ (b) (i) $\angle PBC = 80^\circ$ (ii) $\angle BPC = 20^\circ$ 6. 5.2 cm 7. $\angle R = 90^\circ$ and $PR = 3$ cm 8. 2.6 cm 10. Yes 11. 60° and 40° 12. $x = 28^\circ$.

Exercise 21(A)

1. (i) centre (ii) PQ (iii) AB (iv) secant (v) CD (vi) radius (vii) RS (viii) 10 cm
 (ix) 4 cm (x) tangent 2. (i) 8.4 cm (ii) diameter 3. (i) 3 cm (ii) 4.2 cm
 4. (ii) Equilateral triangle (iii) 60° 8. $\angle ACB = 90^\circ$

Exercise 21(B)

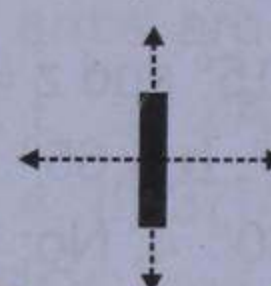
4. 2.8 cm 5. 3.3 cm (approx.)

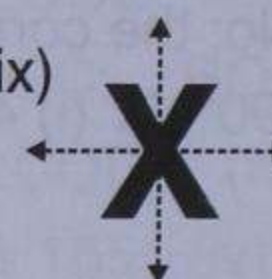
Revision Exercise (Chapter 21)

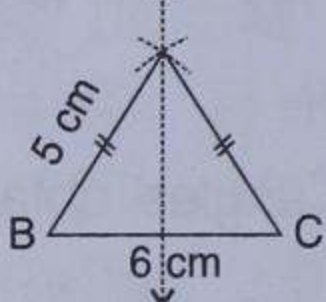
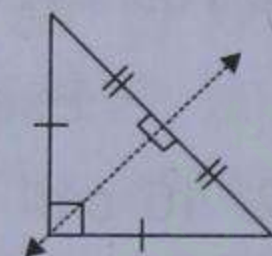
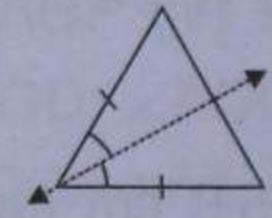
1. (a) outside the circle (b) inside the circle (c) on the circumference of the circle 2. 6.3 cm
 3. No; the chord of a circle is always smaller than or equal to its diameter 4. Quadrant
 5. (i) true (ii) true (iii) true (iv) true (each diameter passes through the centre of the circle)

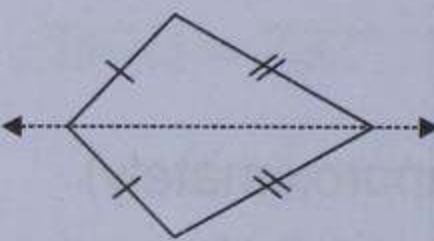
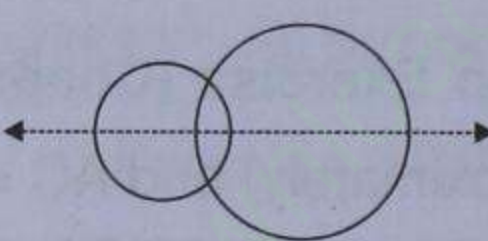
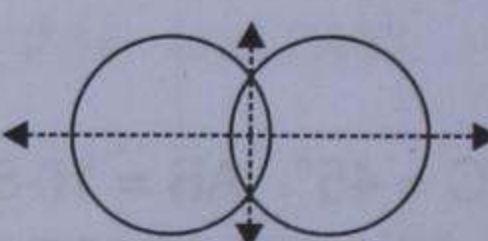
Exercise 22

1. (i) True, if both the semi-circles of B are equal
 (ii) True (iii) False (iv) False (v) False (vi) True (vii) True (viii) False

2. (i)  (ii)  (iii) Not possible (iv)  (v) Not possible

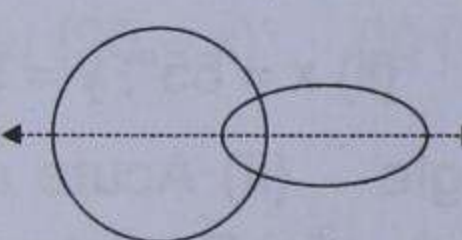
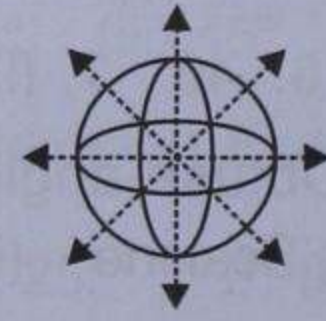
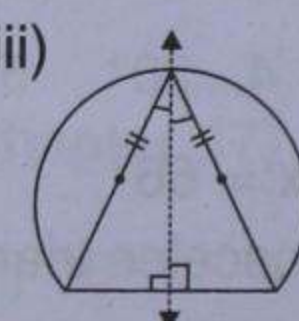
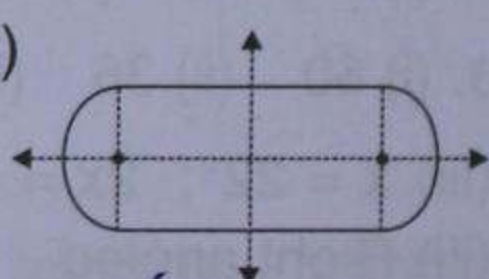
- (vi)  (vii)  (viii)  (ix) 

3.  4. (i) Not possible (ii)  (iii) 

- (iv)  (v)  (vi) 

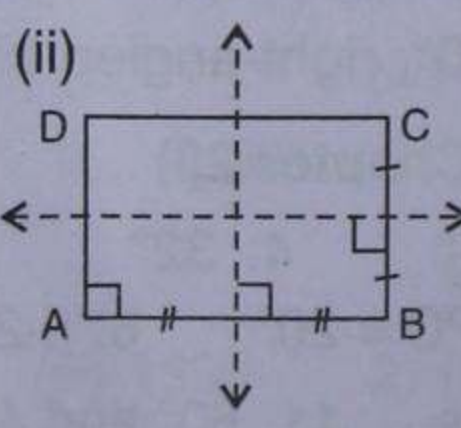
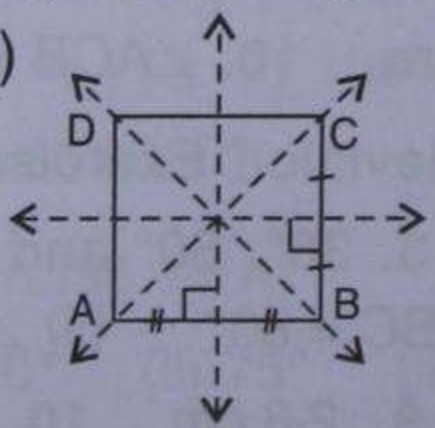
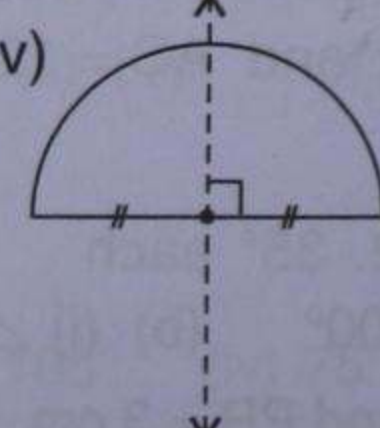
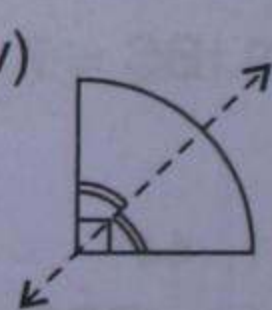
5. Three lines of symmetry; bisector of each angle.

6. Three lines of symmetry, as $\triangle ABC$ is equilateral.

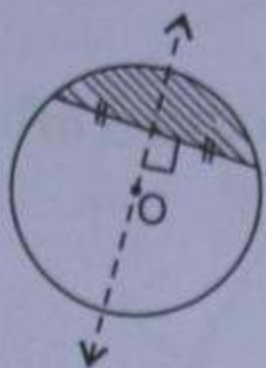
7. (i)  (ii)  (iii)  (iv) 

8. In each case draw perpendicular from point P on the line AB, which meets AB at point Q. From PQ produced cut $QR = PQ$. Point R, so obtained, is the required point.

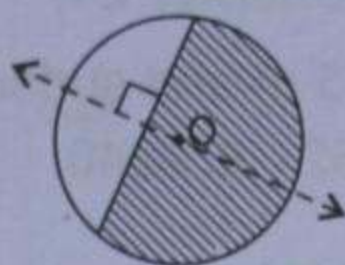
9. PQ is perpendicular bisector of the line segment joining A and B.

11. (i) Parallelogram has no line of symmetry. (ii)  (iii)  (iv)  (v) 

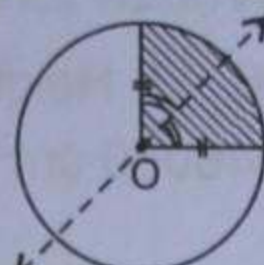
12. (i)



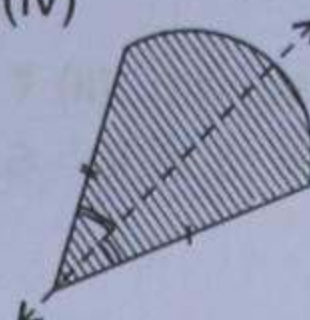
(ii)



(iii)



(iv)



Exercise 23(A)

1. 12 cm 2. (i) 59 m (ii) 413 m 3. 13 cm and 169 cm² 4. 15 m and 60 m
 5. 25600 m² and ₹ 1,28,000 6. (i) 24 m (ii) 96 m (iii) ₹ 307.20 7. (i) 14.4 m² (ii) ₹ 518.40
 8. (i) 12 m (ii) 240 m² 9. (i) 18 m (ii) 450 m² 10. (i) 13 cm (ii) 66 cm 11. (i) 20 m
 (ii) 70 m 12. (i) 6.76 m² (ii) ₹ 270.40 13. (i) 25,000 m² (ii) ₹ 15,000 14. (i) 210 m
 (ii) ₹ 525 15. (i) 568 m (ii) 568 m (iii) $\frac{71}{150}$ m/sec.

Exercise 23(B)

1. (i) 576 cm² (ii) 32 cm (iii) 100 cm 2. (i) 36 cm² (ii) 6 cm (iii) 24 cm 3. 80 cm;
 (i) 20 cm (ii) 400 cm² 4. (i) 4 cm (ii) 32 cm² 5. (i) 304 cm² (ii) 404 m² 6. 56 m²
 7. 156 m² 8. (i) 675 cm² and 120 cm (ii) 440 cm² and 100 cm

Revision Exercise (Chapter 23)

1. Breadth = 75% of 20 cm = $\frac{75}{100} \times 20$ cm = 15 cm, perimeter = 70 cm and area = 300 cm²
 2. Length = 26 m and perimeter = 100 m 3. Breadth = 30 m and perimeter = 150 m
 4. Length = 32 cm, breadth = 24 cm and perimeter = 112 cm 5. ₹ 4,560
 6. (i) 28 m (ii) 1344 sq. m (iii) ₹ 16,800 7. Area = 1296 sq. m and ₹ 7,257.60
 8. 2.88 sq. m and ₹ 43.20 9. (i) 30 m and 10 m (ii) 300 sq. m 10. (i) 60 cm (ii) 15 cm
 (iii) 225 sq. cm 11. (i) 280 m (ii) 840 m 12. (i) 80 cm (ii) 20 cm (iii) 400 sq. cm
 13. (i) 400 sq. cm (ii) 400 sq. cm (iii) 16 cm (iv) 82 cm

Exercise 24(A)

1. Prism (i) AB, BC, CD, DE, EA, A'B', B'C', C'D', D'E', E'A', AA', BB', CC', DD' and EE'
 (ii) BB', CC', DD' and EE' (iii) ABB'A', BCC'B', CDD'C', DEE'D' and EAA'E'
 (iv) A, B, C, D, E, A', B', C', D' and E' 2. (i) pyramid (ii) 4, triangle (iii) $\triangle PAB$, $\triangle PBC$, $\triangle PCD$
 and $\triangle PDA$ (iv) quadrilateral, quadrilateral pyramid (v) vertex 3. (i) 80 cm² (ii) 72 cm²
 (iii) 90 cm²; ABFE = 80 cm², ABCD = 72 cm² and BCGF = 90 cm² 4. (i) 81 cm²
 (ii) 486 cm² 5. (i) $l = 8$ cm; $P = 184$ cm³ (ii) $b = 4$ m; $P = 52$ m² (iii) $h = 4.8$ cm;
 $P = 111.6$ cm² 6. (i) 4 cm; 96 cm² (ii) 13.824 m³; 34.56 m² (iii) 125 cm³; 5 cm
 7. 38.4 m³ 8. 960 cm³; 592 cm² 9. (i) 343 cm³; 294 cm² (ii) 9.261 cm³; 26.46 cm²
 (iii) 3.375 m³; 13.5 m² 10. (i) 10.8 cm³; 30.6 cm² (ii) 360 m³; 306 m²
 11. (i) 4 cm (ii) 3 cm (iii) 6 cm 13. 6 cm and 216 cm³

Exercise 24(B)

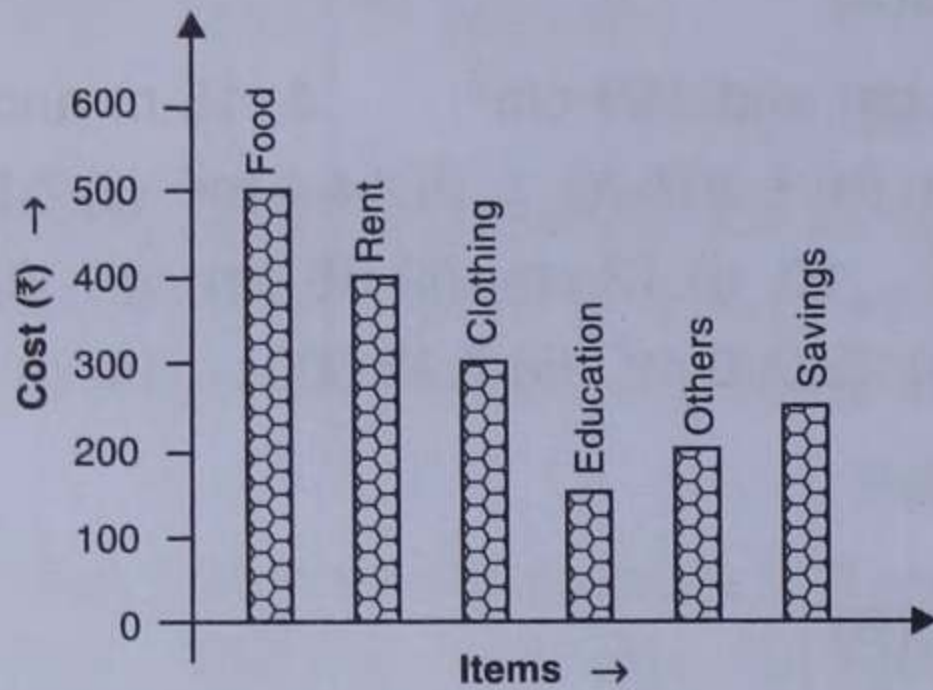
1. 3600 litres 2. 5.4 litres 3. 60 4. 16 5. (i) 8000 cm³ (ii) 8000 cm³ (iii) 20
 6. (i) 3375 cm³ (ii) 3375 cm³ (iii) 15 cm

Revision Exercise (Chapter 24)

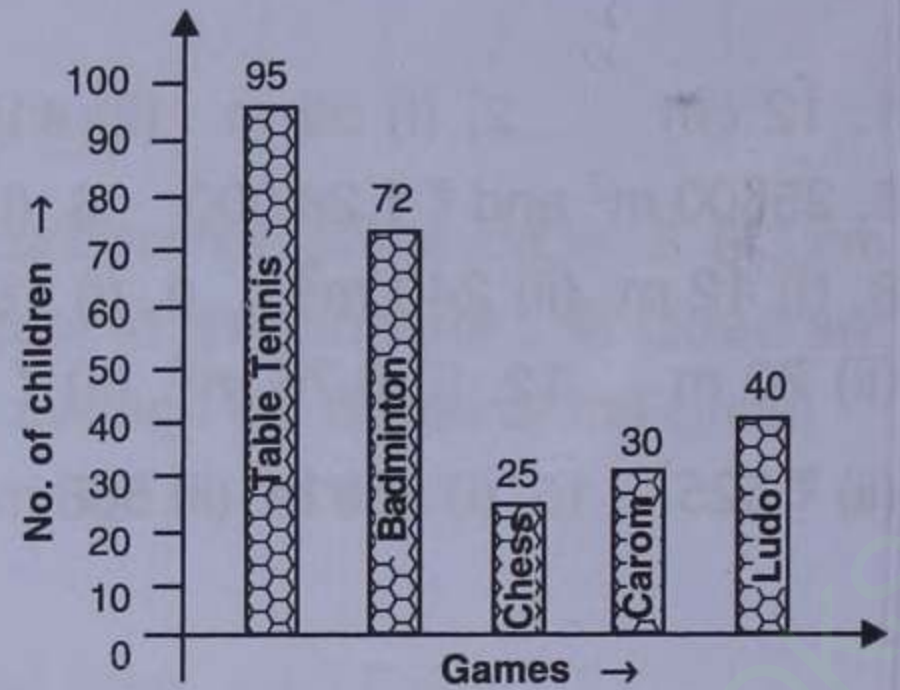
1. (i) 5328 sq. cm (ii) ₹ 2,397.60 2. Height = 3.75 m and surface area = 212.5 m² 3. 3 m
4. 28.56 m³ 5. 600 6. 72 7. 46080 cm³ 8. 162 9. 2240

Exercise 25(A)

1.



2.

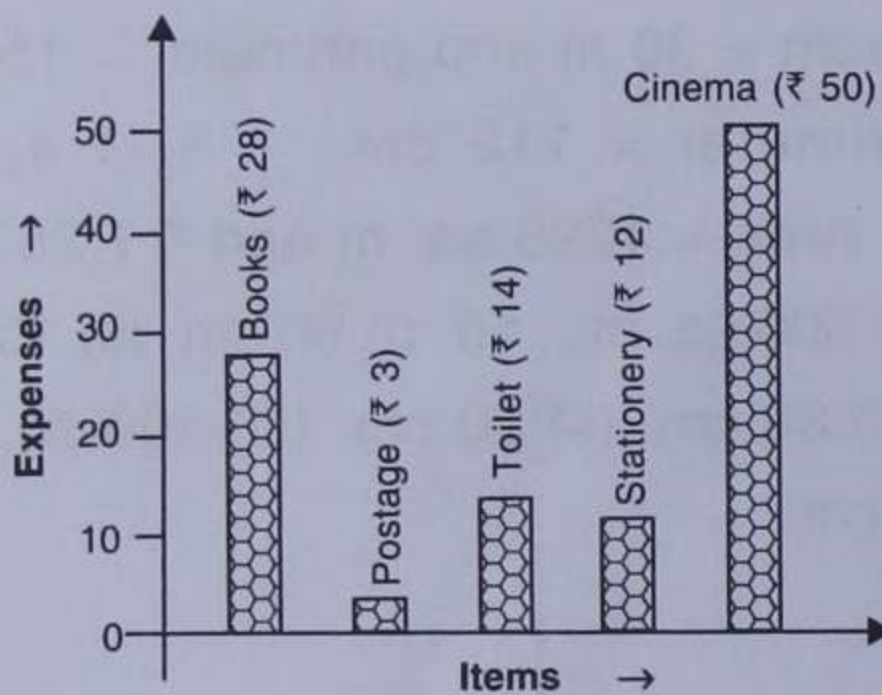


3. (i) 100 in Class 1, 90 in Class 2, 100 in Class 3, 80 in Class 4, 120 in Class 5, 90 in Class 6, 70 in Class 7 and 50 in Class 8.

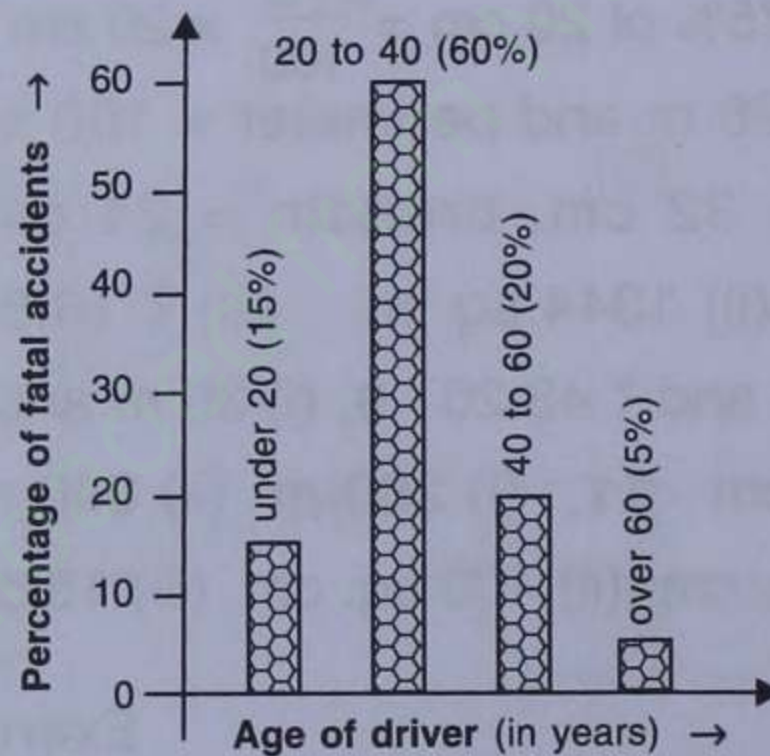
(ii) 210 (iii) 30 (iv) 700 (v) 87.5

4. (i) Tueseday (ii) Friday (iii) Sunday and Thursday (iv) 300

5.

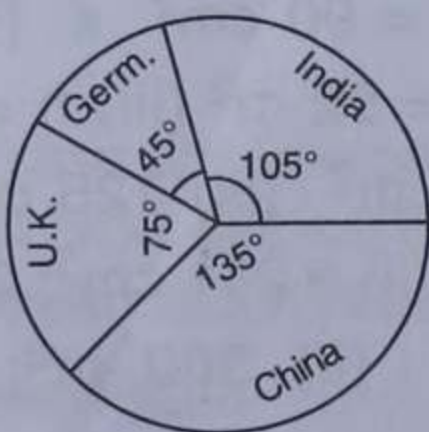


6.

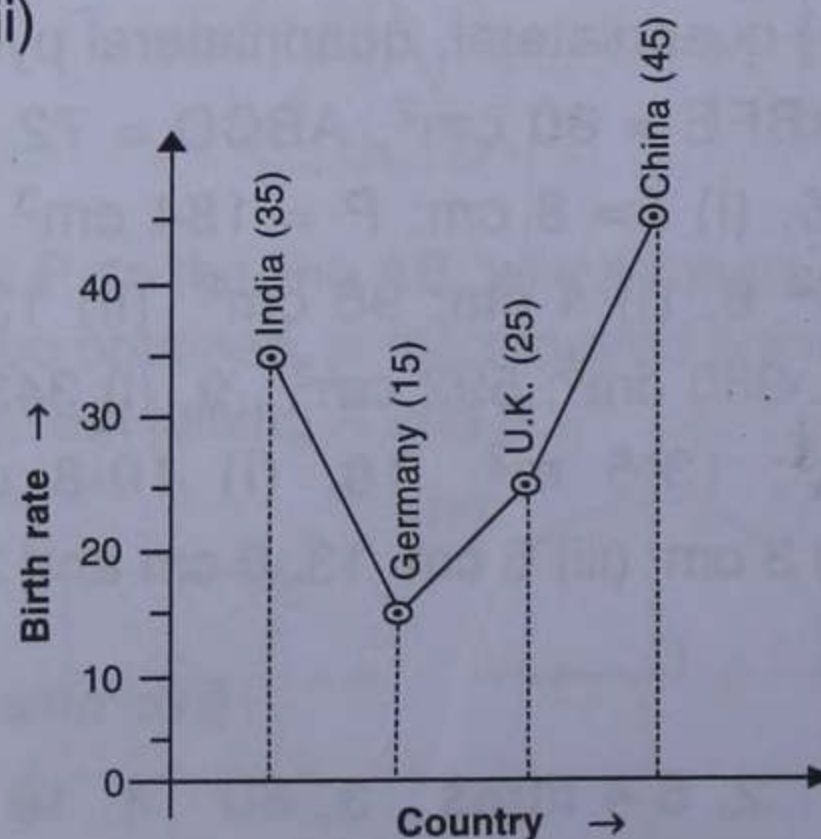


Exercise 25(B)

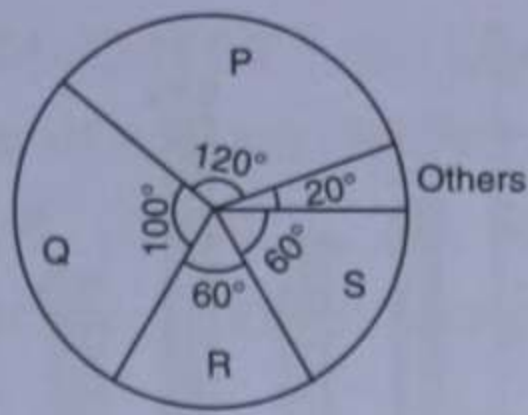
1. (i)



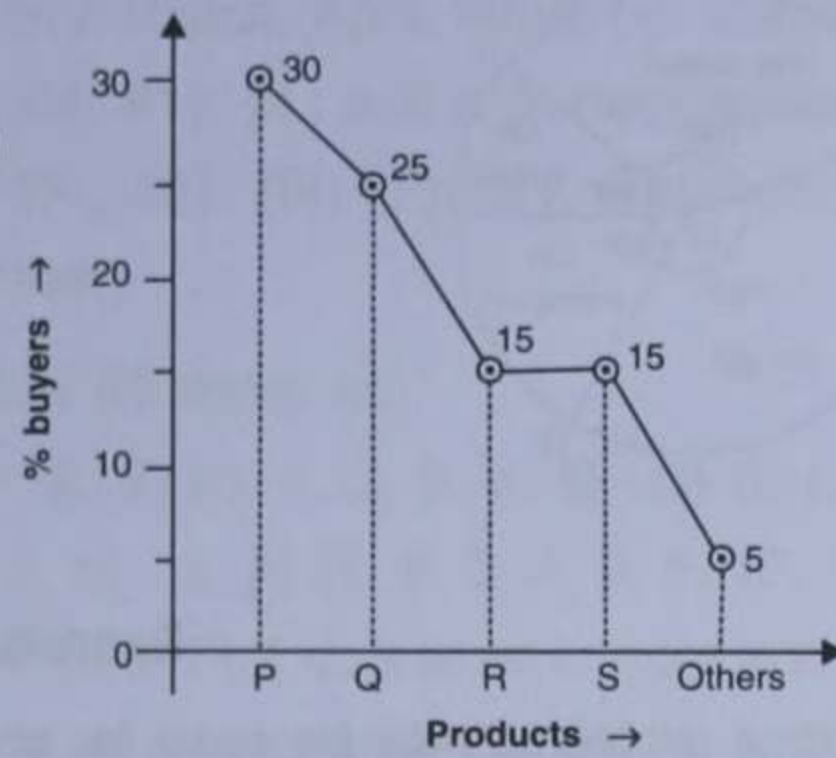
(ii)



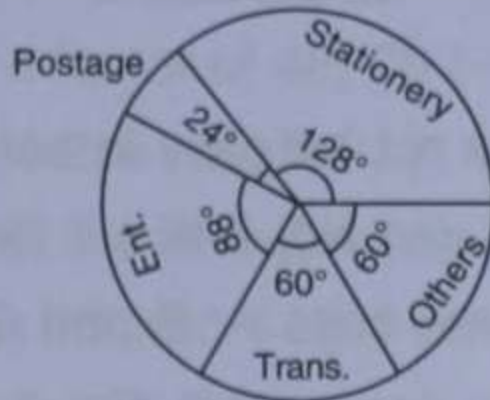
2. (i)



(ii)



3.



4. $\therefore 75^\circ$ represents ₹ 720

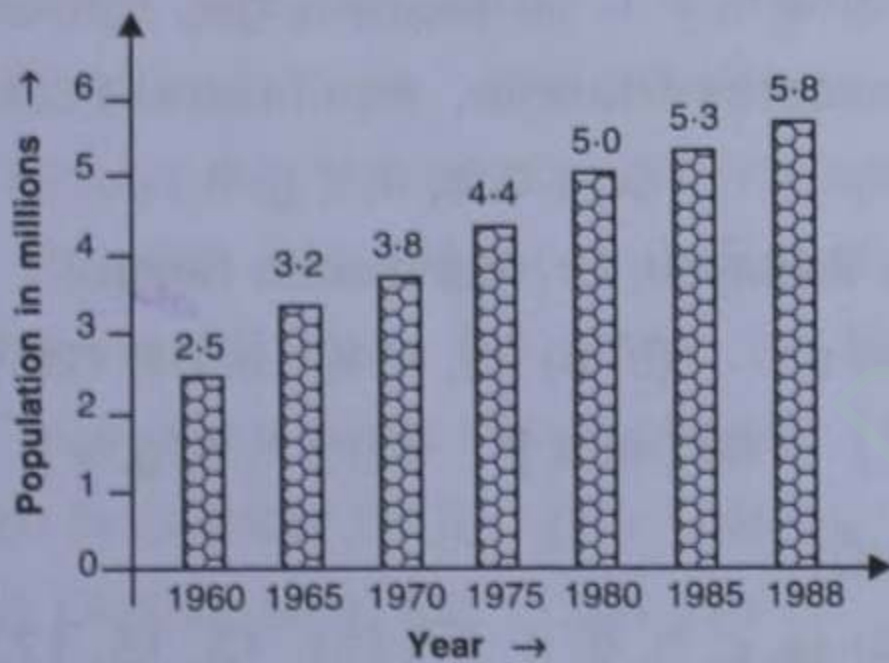
$$\Rightarrow 1^\circ \text{ will represent} = ₹ \frac{720}{75}$$

$$\text{and } 360^\circ \text{ will represent} = ₹ \frac{720}{75} \times 360 = ₹ 3,456$$

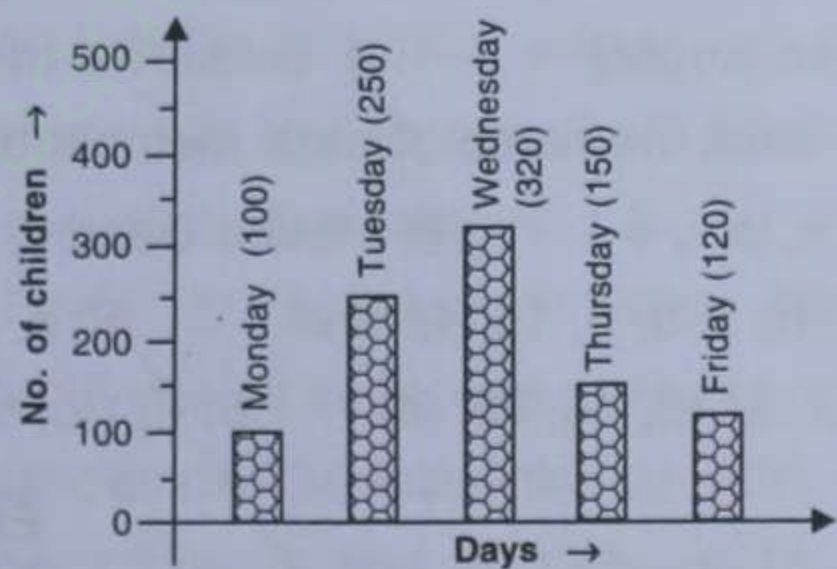
$$\therefore \text{Total income} = ₹ 3,456$$

Revision Exercise (Chapter 25)

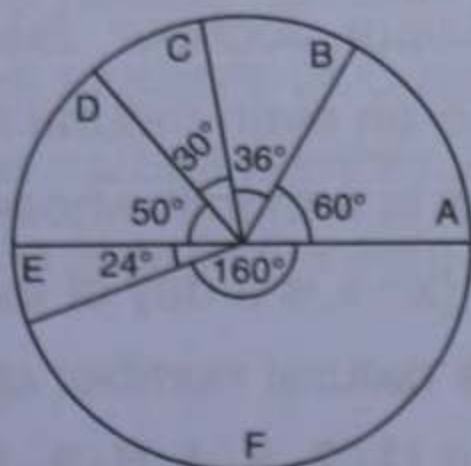
1.



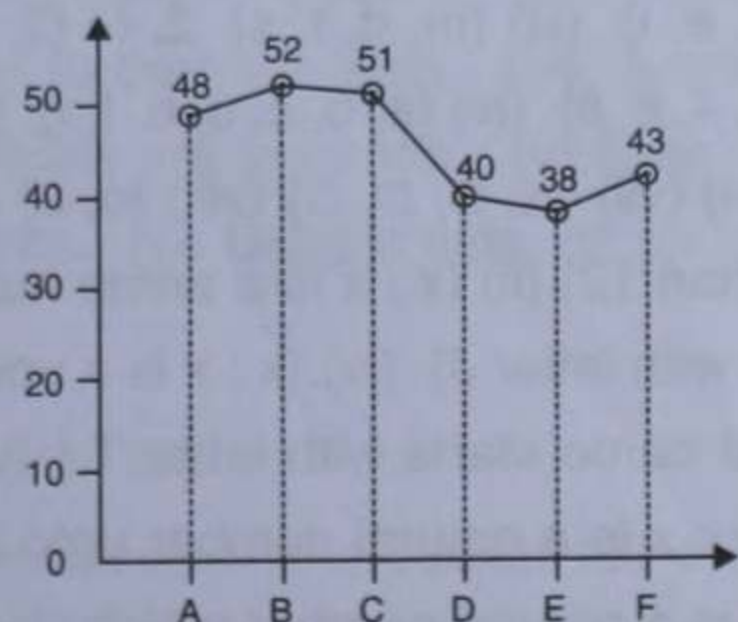
2.



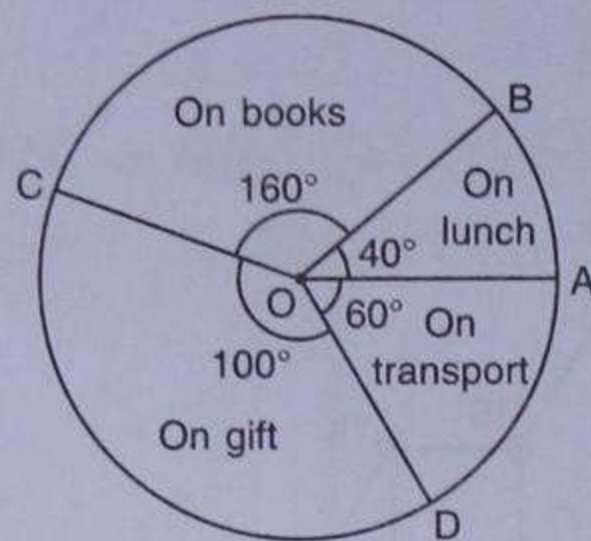
4.



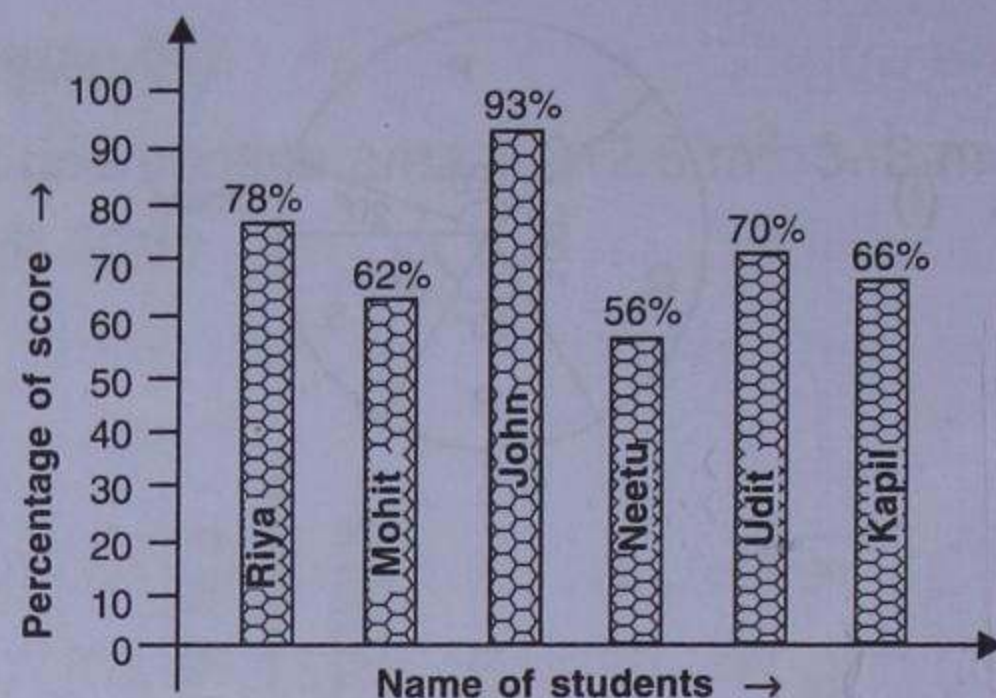
5.



6.



7.



Exercise 26(A)

1. (i) No; some problems may be easy for one person but may not be easy to some other persons. Objects are not well-defined. (ii) Yes (iii) Yes. (iv) No; it is not mentioned that the boys must be taller than which boy. If we consider three boys A, B and C; boy A can be taller than B but not necessarily taller than C. (v) Yes (vi) No; it may be difficult for one student to draw a given triangle but to some other student it may not be difficult to draw the same triangle. (vii) Yes (viii) No; a fruit may be tasty for one person and may not be tasty to other person/persons. (ix) No; clever in what respect? (x) No; all the people cannot find the same schools as good schools. So, the objects are not well-defined. (xi) Yes (xii) Yes (xiii) Yes.

Exercise 26(B)

1. (i) True (ii) True (iii) False (iv) False 2. (i) wrong; $5 \notin B$ (ii) correct (iii) correct (iv) wrong; $9 \notin B$ (v) correct (vi) correct. 3. (i) False (ii) True (iii) False (iv) True (v) True (vi) True (vii) True 4. (i) $\{1, 2, 3, 4, 5\}$ (ii) $\{\text{acute-angle, right-angle, obtuse-angle}\}$ (iii) $\{\text{scalene-triangle, isosceles-triangle, equilateral-triangle}\}$ (iv) $\{\text{Write the name of each member of your family}\}$ (v) $\{b, c, d, f, g, h\}$ (vi) $\{a, e, i, o\}$ (vii) $\{\text{Indira Gandhi, Atal Bihari Vajpayee, Dr. Manmohan Singh}\}$ 5. (a) (i) 3, 8, 5, 15, 12 and 7 (ii) c, m, n, o and s (b) (i) $\{2, 4, 8, 16, 64, 128\}$ (ii) $\{3, 5, 15, 45, 75, 90\}$ 6. (i) $\{b, h, o, p, a, l\}$ (ii) $\{e, a\}$ (iii) $\{h, n, g, k\}$

Exercise 26(C)

1. (i) $\{3, 6, 9, 12, 15\}$ (ii) $\{-3, -2, -1, 0, 1, 2, 3\}$ (iii) $\{s, c, h, o, l\}$ (iv) $\{11, 13, 15, 17, 19\}$ (v) $\{a, e, i\}$ (vi) $\{m, d, r, s\}$ 2. (i) $\{2, 3, 5, 7, 11, 13, 17, 19\}$ (ii) $\{1^2, 2^2, 3^2, 4^2\} = \{1, 4, 9, 16\}$ (iii) $\{2, 4, 6, 8\}$ (iv) $\{a, b, c, d, e, f, g, h\}$ (v) $\{b, a, s, k, e, t\}$ (vi) $\{\text{Jaipur, Jodhpur, Jalandhar, Jhansi}\}$ (vii) $\{\triangle, \bigcirc, \square, \diamond\}$ (viii) $\{o, a\}$ (ix) $\{0, 1, 4, 9\}$ 3. (i) $\{x : x \text{ is an even natural number less than } 12\}$ (ii) $\{x : x \text{ is a prime number less than } 12\}$ (iii) $\{x : x \text{ is a month whose name starts with letter J}\}$ (iv) $\{x : x \text{ is a vowel in English alphabet}\}$ (v) $\{x : x \text{ is a day of the week whose name starts with letter T}\}$ (vi) $\{x : x \text{ is a perfect square natural number upto } 25\}$ (vii) $\{x : x \text{ is a natural number upto } 30 \text{ and divisible by } 5\}$. 4. (i) $\{1, 2, 3, 4, 6, 8, 12, 24\}$; $\{x : x \text{ is a natural number which divides } 24 \text{ completely}\}$ (ii) $\{21, 23, 25, 27, 29, 31, 33\}$; $\{x : x \text{ is an odd number between } 20 \text{ and } 35\}$ (iii) $\{c, a, l, u, t\}$; $\{x : x \text{ is a letter used in}\}$

the word 'CALCUTTA' } (iv) {January, February, March, April, May}; {x : x is name of first five months of a year} (v) {16, 25, 36, 49, 64, 81}; {x : x is a perfect square two digit number}. **5.** (i) {5, 15, 25, 35} (ii) {18, 24, 30} (iii) {Friday, Saturday, Sunday} (iv) {September, October, November, December}

Revision Exercise (Chapter 26)

- 1.** (i) yes (ii) no (iii) yes (iv) no (v) yes **2.** (i) {0, 1, 2, 3, 4, 5} (ii) {t, r, p, d, s, h} (iii) {17, 26, 35, 44, 53, 62, 71, 80} (iv) {2, 3, 5} **3.** (i) {1, 2, 3, 4, 6, 8, 12, 16, 24, 48}; {x : x is a factor of 48} (ii) {-2, -1, 0, 1, 2, 3, 4, 5, 6, 7}; {x : x is an integer and $-3 < x < 8$ } (iii) {-3, -2, -1, 0, 1, 2, 3, 4, 5, 6, 7, 8}; {x : x is an integer and $-3 \leq x \leq 8$ } **4.** (i) {1, 2, 3, 4, 5, 6, 7, 8, 9}; Set of natural numbers less than 10. (ii) {0, 1, 2, 3}; Set of whole numbers between -3 and 4 (iii) {33, 36, 39, 42,}; Set of whole numbers greater than 30 and divisible by 3. (iv) {r, e, s, o, n, a, c}; Set of letters in the word RESONANCE (v) {0, 5, 10, 15,}; Set of whole numbers divisible by 5. (vi) {11, 13, 17, 19, 23, 29}; Set of prime numbers between 10 and 30 **5.** (i) 0, 1, 4, 9 and 16 (ii) 2^3 , 4^3 and 6^3 i.e. 8, 64 and 216 (iii) 24, 28, 32 and 36 (iv) 16, 18, 20, 21, 24, 27, 28, 30, 32, 33, 36 and 39 (v) 24 and 36 **6.** M = {February, April, June, September, November} **7.** P = {1, 2, 3, 6, 9, 18} **8.** (i) {12, 14, 16, 18, 20, 22} (ii) {10, 12, 14, 16, 18, 20, 22, 24} (iii) {p, i, n, e, a, l} (iv) {2, 5} (vi) {12, 24, 36, 48, 60, 72, 84, 96}

Exercise 27

- 1.** (i) Infinite (ii) Finite (iii) Infinite (iv) Finite **2.** (i), (iii) and (iv) **3.** (i) Equal (ii) Equivalent (iii) Equal (iv) Equivalent **4.** (i) Infinite (ii) Infinite (iii) Infinite (iv) Finite (v) Infinite (vi) Finite (vii) Finite (viii) Infinite (ix) Infinite (x) Infinite **5.** (i) Not empty (ii) Empty (iii) Empty (iv) Not empty (v) Not empty (vi) Empty (vii) Not empty **6.** (i) Equivalent (ii) Equal (iii) Equal (iv) Equal (v) Equal (vi) Equivalent **7.** (i) Finite (ii) Infinite (iii) Finite (iv) Finite (v) Infinite (vi) Finite **8.** (i) False (ii) False (iii) True (iv) True (each set is the empty set) (v) True (vi) False (6 is an even natural number which is divisible by 3) (vii) True (no positive number can be less than 0) (viii) False **9.** (i) Disjoint sets; as no girl can be of age below 15 years and also above 15 years (ii) Overlapping sets; as boys above 27 years are also above 20 years. (iii) Overlapping sets; as natural numbers from 51 to 59 are common to both the sets. (iv) Overlapping sets; as students of Class IX studying in I.C.S.E. Board are common. (v) Overlapping sets; as natural number 24 is common to both the sets. (vi) Disjoint sets; as no letter is common to both the sets.

Revision Exercise (Chapter 27)

- 1.** Tea-set, dinner-set, sofa-set **2.** Set of water molecules in a bucket full of water, Set of light-rays coming out of a glowing bulb. **3.** Set of full sized mango-trees in your

bed-room, Set of electrical appliances which work without electric current, Set of motor-cycle which run on four wheels. **4.** (i) empty (ii) infinite (iii) finite (iv) infinite (v) empty (vi) infinite (vii) infinite (viii) empty (ix) finite (x) empty **5.** (i) joint (ii) joint (iii) joint (iv) joint **6.** (ii), (iii), (iv) and (vi).

Exercise 28(A)

- 1.** (i) True (ii) True (iii) False (iv) False (v) False (vi) True (vii) True (viii) True
2. (i) {2, 3, 4, 6, 8, 9, 10, 12, 15} (ii) { } (iii) {6, 12} (iv) {2, 3, 4, 6, 8, 9, 10, 12, 15}
 (v) {1, 3, 4, 6, 7, 9, 10, 12, 13, 15, 16}; Yes, $A \cup B = B \cup A$. No, $B \cap C \neq B \cup C$
3. (i) {1, 2, 3, 4, 5, 7} (ii) {2, 3, 4, 5, 6, 7} (iii) {2, 3, 4, 5, 7} **4.** (i) {c, d} (ii) {b, d}
 (iii) {b, c, d} **5.** (i) {2, 4, 6, 8, 9, 10, 12} (ii) {1, 2, 3, 4, 5, 6, 7, 8, 12, 16} (iii) {6, 8, 9, 12, 16}
 (iv) {6} (v) {1, 2, 3, 4, 5, 6, 7} (vi) {2, 4, 6, 8}.

Exercise 28(B)

- 1.** (i) {3, 5} (ii) {2, 8} **2.** (i) {2, 4, 8, 10} (ii) {3, 9, 15} (iii) {0, 18} (iv) {2, 4, 8, 10}
3. (i) {c, d, m} (ii) {e, x} (iii) {a, i, o} **4.** (i) {31, 33, 34, 35, 37, 38, 39} (ii) {24, 28, 40, 44, 48}
5. (i) {n, s} (ii) {i, n, d} (iii) {r, s}

Revision Exercise (Chapter 28)

- 1.** (i) {2, 3, 4, 6, 8, 9, 10, 12, 15} (ii) {6, 12} (iii) {2, 4, 8, 10} (iv) {3, 9, 15}
2. (i) {3, 5, 6, 8, 9, 11, 12, 13, 15} (ii) {9} (iii) {5, 11} **3.** (i) m, o, r, a, d, b, s (ii) {m, a, r, d}
 (iii) {o, b} (iv) {s} **4.** (i) {2, 4, 6, 8, 12, 24} (ii) {1, 3} **5.** (i) {3, 4, 6, 8, 9, 12, 15, 16, 18, 20, 21, 24, 27, 28, 30, 32, 33, 36} (ii) {6, 12, 18, 24, 30, 36} (iii) {12, 24, 36}
 (iv) {6, 12, 18, 24, 30, 36} (v) {3, 4, 6, 8, 9, 12, 15, 16, 18, 20, 21, 24, 27, 28, 30, 32, 33, 36} **8.** (i) {1, 3, 5, 7, 9, 11, 13} (ii) {3, 7, 9, 11} (iii) {1, 5} (iv) {13}
 (v) {13} (vi) {13} (vii) {1, 13}

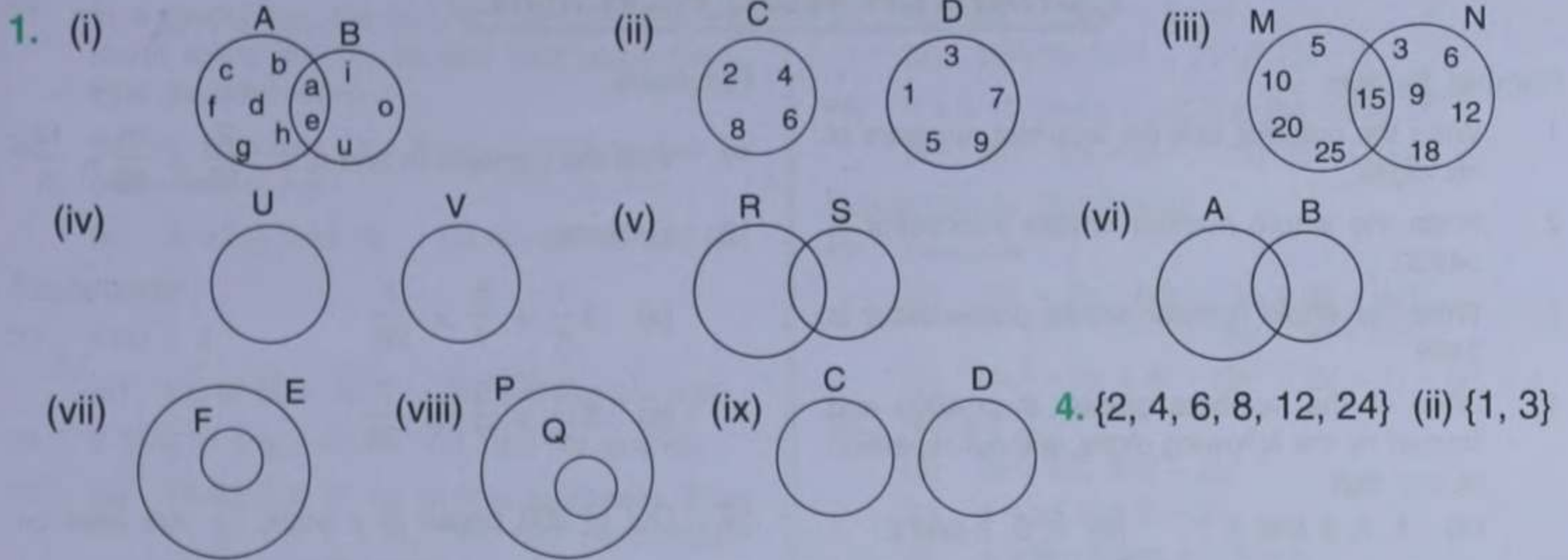
Exercise 29

- 1.** (i) 4 (ii) 6 (iii) 0 (iv) 3 (v) 4 (vi) 7 **2.** (i) 9 (ii) 4 (iii) 4 (iv) 0 (v) {1, 2, 3, 4, 5, 6, 7, 8, 9, p, u, e, t}; 13 (vi) {1, 4, 9}; 3 (vii) 4 (viii) 0 (ix) 8 (x) 9 **3.** (i) 8
 (ii) 7 (iii) 1 (iv) 8 (v) 7; Yes **4.** (i) 5 (ii) 0 (iii) 5 (iv) 0; No; No; Yes
5. (i) False; $n(A) = 1$ (ii) False; $n(\emptyset) = 0$ (iii) True (iv) False; $n(B) = 4$.

Revision Exercise (Chapter 29)

- 1.** (i) false (ii) true (iii) true (iv) false (v) false (vi) true **2.** (i) {5, 6, 7, 8, 9, 10} and 6
 (ii) {7, 8, 9} and 3 **3.** yes **4.** (i) {2, 4, 6, 8, 10, 12, 16, 18} (ii) {4, 8, 12} (iii) 6 and 5
 (iv) 8 and 3 (v) 11 (vi) 11 **5.** (i) {10, 20, 30, 40} (ii) the empty set i.e. { } (iii) 4 (iv) 0
6. (i) $P = \{16, 17, 18, 19, 20, 21, 22\}$ (ii) $n(P) = 7$
7. (i) $M = \{0, 1, 2, 3, 4, 5, 6, 7\}$ (ii) $n(M) = 8$
8. (i) $S = \{5, 6, 7, 8, 9, 10, 11, 12, 13, 14\}$ (ii) $n(S) = 10$

Exercise 30



2. (i) {0, 2, 5, 10, 17, 25, 28} (ii) {0, 2, 4, 6, 7, 8, 9, 10, 11, 12} (iii) {0, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 17, 25, 28} (iv) {0, 2, 10} (v) 7 (vi) 10 (vii) 14 (viii) 3
3. (i) {4, 6, 7, 8} (ii) {4, 5, 6, 7, 8, 9, 10, 11} (iii) {4, 5, 6, 7, 8, 9, 10, 11} (iv) {4, 6, 7, 8}
4. (i) {a, b, c, d} (ii) $\emptyset$ (iii) {a, b, c, d} (iv) $\emptyset$ 5. (i) {0, 4, 5, 6, 8, 10, 13} (ii) {o, x, y, z, m, n} (iii) {0, 4, 5, 6, 8, 10, 13, o, x, y, z, m, n} (iv) { }
6. (i) {0, 1, 2, 3, 5, 8, 9} (ii) {2, 3, 6, 8} (iii) {3, 4, 5, 8} (iv) {2, 3, 4, 5, 6, 7, 8} (v) {1, 2, 3, 4, 5, 6, 7}
7. (i) {3, 4} (ii) {4, 8, 9} (iii) { }

Revision Exercise (Chapter 30)

- 1.
- $A \cap B = \phi$
and $A \cup B = \{2, 4, 6, 7, 8, 9, 10, 11\}$
- 2.
- $P \cap Q = \{9, 10, 11\}$
and $P \cup Q = \{5, 6, 7, 8, 9, 10, 11, 12, 13, 14\}$
- 3.
- $A \cap B = \{1, 2, 3, 4, 5\}$
and $A \cup B = \{0, 1, 2, 3, 4, 5, 6, 7\}$
- 4.
- $M \cap N = \{7, 8, 9\}$
and $M \cup N = \{6, 7, 8, 9, 10\}$
5. (a) (i) $A = \{2, 4, 6\}$ (ii) $B = \{1, 3, 5, 7, 9\}$ (iii) $A \cup B = \{1, 2, 3, 4, 5, 6, 7, 9\}$ (iv) $A \cap B = \phi$
(b) (i) $A = \{2, 4, 6\}$ (ii) $B = \{1, 2, 3, 4, 5, 6, 7, 9\}$ (iii) $A \cup B = \{1, 2, 3, 4, 5, 6, 7, 9\}$ (iv) $A \cap B = \{2, 4, 6\}$
(c) (i) $A = \{2, 4, 6, 10, 11\}$ (ii) $B = \{2, 3, 4, 5, 6, 7, 9\}$ (iii) $A \cup B = \{2, 3, 4, 5, 6, 7, 9, 10, 11\}$ (iv) $A \cap B = \{2, 4, 6\}$
6. (i) ϕ (ii) {f} (iii) {a, b, c, d, e, f} (iv) {a, b, c, f, g, h}. B and C are intersecting sets. A and B as well as A and C are disjoint sets.