

Key book

Understanding Mathematics

7



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Exercise I.1

1. (a) 8 (b) -8
2. Fall in temperature is greater in Roorkee by 5°C .
3. (a) +3000 *m* (b) + Rs 5000 (c) - Rs 500
4. -11 5. 160 6. -50 *km*, -20 *km*
7. Rs 12
9. (a) 6062 (b) 0 (c) -168 (d) 1599

Exercise I.2

1. (a) True (b) False (c) True (d) True
- 3.

X	-11	-10	9	-8	-7	6
-6	66	60	-54	48	42	-36
5	-55	-50	45	-40	-35	30
-4	44	40	-36	32	28	-24
-3	33	30	-27	24	21	-18

4. (a) -60 (b) 0 (c) 1265 (d) 0
6. (a) 139800 (b) -234500 (c) 485000 (d) -32017
7. 16 min 8. Rs 350

Exercise I.3

1. (a) 1 (b) -27 (c) -14 (d) 13
2. (a) False (b) True (c) False (d) False
- (e) False
3. 22 4. -81 5. 7 hours 6. 56
7. 7 days
8. a) 3 b) 6 c) 576 d) -138

MCQ - I

1. -1 2. none 3. -12°C 4. 449300
5. -1325600 6. not defined 7. 48 8. 17
9. 1 10. 81

Revision Exercise

1. -6, -5 -4, -3, -2
2. 1, 2, 3, 4, 5
3. -13, -7, -5, 2, 5, 6
4. 304, 253, 212, 53, -67, -142, -467
5. (a) 7, 11 (b) -19, -24
7. (a) 345 (b) -5 (c) -810 (d) 68
8. 254 9. 29 units
10. (a) 4 (b) 156
11. -192 12. -13 13. Rs 4100

Exercise 2.1

1. (a) = (b) > (c) = (d) <
2. (a) $\frac{2}{3}, \frac{8}{21}, \frac{2}{9}$ (b) $\frac{7}{10}, \frac{3}{7}, \frac{1}{5}$ (c) $\frac{7}{15}, \frac{22}{45}, \frac{3}{5}$ (d) $\frac{13}{24}, \frac{5}{8}, \frac{11}{16}$
3. $\frac{6}{22}, \frac{9}{33}, \frac{12}{44}, \frac{15}{55}$
4. (a) $\frac{27}{6}$ (b) $2\frac{7}{24}$ (c) $\frac{1}{25}$ (d) $5\frac{29}{30}$
(e) $6\frac{1}{24}$
5. $2\frac{1}{2}$ 6. $15\frac{1}{5}cm$
7. (a) $10\frac{1}{2}$ (b) $17\frac{1}{2}$ 8. $\frac{2}{5}$, Sona ate more by $\frac{1}{5}$

Exercise 2.2

1. (a) $\frac{1}{14}$ (b) $\frac{2}{56}$ (c) $\frac{20}{117}$ (d) $\frac{319}{35}$
(e) $\frac{24}{144}$ (f) $\frac{28}{504}$ (g) $\frac{459}{169}$ (h) $\frac{28}{72}$
(i) $\frac{286}{405}$ (j) $\frac{156}{624}$ (k) $\frac{1215}{2700}$ (l) $\frac{600}{720}$
2. (a) $\frac{3}{2}$ (b) $\frac{7}{4}$ (c) 1 (d) $\frac{4}{3}$
(e) $\frac{13}{9}$ (f) $\frac{1}{18}$ (g) $\frac{266}{27}$ (h) $\frac{574}{39}$
(i) $\frac{95}{8}$ (j) 1 (k) $\frac{885}{28}$ (l) $\frac{777}{20}$
3. (a) $\frac{11}{2}$ (b) $\frac{23}{5}$ (c) $\frac{5}{2}$ (d) $\frac{7}{4}$
(e) 3 (f) $-\frac{22}{5}$
4. $-\frac{31}{30}$

Exercise 2.3

1. (a) 16 (b) 25 (c) $\frac{7}{5}$ (d) $\frac{64}{15}$
(e) 2 (f) $\frac{121}{2}$ (g) $\frac{8}{3}$ (h) $\frac{25}{47}$
2. (a) $\frac{1}{16}$ (b) $\frac{1}{55}$ (c) $\frac{3}{91}$ (d) $\frac{3}{289}$
(e) $\frac{2}{143}$ (f) $\frac{11}{36}$ (g) $\frac{3}{104}$ (h) $\frac{31}{49}$
3. (a) $\frac{4}{5}$ (b) $\frac{5}{6}$ (c) $\frac{21}{16}$ (d) $\frac{91}{18}$
(e) $\frac{169}{225}$ (f) $\frac{5}{7}$ (g) $\frac{155}{226}$ (h) $\frac{10}{17}$

Exercise 2.4

1. 16 2. $4\frac{32}{35}kg$ 3. $\frac{11}{105}m$ 4. $\frac{2}{3}litre$
5. Rs 373 $\frac{7}{20}$ 6. (a) 540 hectares (b) 300 hectares

7. Rs 110 8. $11\frac{11}{27}$ 9. 3344 10. $15\frac{1}{9}$ km
 11. $\frac{41}{66}$ 12. $25\frac{5}{7}$ kg 13. $15\frac{2}{3}$ 14. $4\frac{217}{242}$
 15. Rs 171, Rs 410.4, Rs 444.6 16. Rs 200, Rs 300, Rs 400

MCQ - II

1. $\frac{4}{5}$ 2. $1\frac{2}{5}$ 3. Sonu ate more than Ritu
 4. $\frac{8}{45}$ 5. 625 g 6. $2\frac{1}{9}$ 7. $150\frac{7}{8}$
 8. $\frac{27}{40}$ 9. $2\frac{1}{3}$ 10. $\frac{5}{7}$

Revision Exercise

1. (a) $7\frac{4}{5}$ (b) $11\frac{11}{12}$ (c) $4\frac{1}{2}$ (d) $4\frac{4}{5}$
 (e) $3\frac{1}{2}$ (f) $22\frac{2}{7}$
 2. (a) $\frac{25}{11}$ (b) $\frac{23}{6}$ (c) $\frac{30}{7}$ (d) $\frac{65}{4}$
 (e) $\frac{153}{7}$ (f) $\frac{197}{17}$
 3. $\frac{6}{8}, \frac{9}{12}, \frac{12}{16}, \frac{15}{20}$
 4. (a) $\frac{1}{6}, \frac{2}{3}, \frac{7}{9}, \frac{4}{5}$ (b) $\frac{3}{8}, \frac{1}{2}, \frac{2}{3}, \frac{5}{6}$ (c) $\frac{1}{4}, \frac{3}{8}, \frac{7}{12}, \frac{5}{6}$
 5. (a) $\frac{5}{6}, \frac{2}{3}, \frac{7}{12}, \frac{5}{9}$ (b) $\frac{19}{6}, \frac{7}{4}, \frac{3}{2}, \frac{5}{8}$ (c) $\frac{8}{9}, \frac{3}{4}, \frac{6}{9}, \frac{1}{3}$
 6. (a) $\frac{11}{15}$ (b) $-\frac{19}{98}$ (c) $\frac{1}{10}$ (d) $3\frac{17}{45}$
 7. Rs $12\frac{1}{2}$
 8. Rs 1806, Rs 2107, Rs 602
 9. $\frac{21}{11}$ 10. $\frac{88}{43}$
 11. (a) Rs 7700 (b) Rs 2100 (c) Rs 1400

Chapter 3

Rational Numbers

Exercise 3.1

1. (a) -4 (b) -13 (c) 4 (d) -17
 (e) -12 (f) 17 2. (a), (c), (e) and (f)
 3. (a) Numerator = -3, denominator = 4
 (b) Numerator = -7, denominator = 18
 (c) Numerator = -11, denominator = -13
 (d) Numerator = 14, denominator = 21
 (e) Numerator = 0, denominator = 5
 (f) Numerator = -3, denominator = 7
 4. $-\frac{7}{8}, \frac{7}{14}, -\frac{9}{17}$ 5. (a), (b), (c), (e)

Exercise 3.2

2. (a) 20 (b) -49 (c) -48 (d) -176
3. (a) 10 (b) -24 (c) -56 (d) -15
4. (a) $\frac{5}{11}$ (b) $-\frac{1}{8}$ (c) $-\frac{11}{25}$ (d) $\frac{9}{8}$
 (e) $\frac{61}{161}$ (f) $\frac{3}{16}$
5. (a) 24 (b) 24 (c) $\frac{3}{4}$ (d) $\frac{7}{71}$
 (e) $\frac{81}{39}$ (f) $\frac{7}{77}$
6. (a) In ascending order : $-\frac{3}{4}, \frac{5}{8}, \frac{2}{3}, \frac{5}{6}, \frac{11}{12}$
 In descending order : $\frac{11}{12}, \frac{5}{6}, \frac{2}{3}, \frac{5}{8}, -\frac{3}{4}$
 (b) In ascending order : $-\frac{9}{10}, -\frac{13}{10}, \frac{6}{15}, \frac{7}{12}, \frac{3}{5}$
 In descending order : $\frac{3}{5}, \frac{7}{12}, \frac{6}{15}, -\frac{13}{10}, -\frac{9}{10}$

Exercise 3.3

1. (a) $\frac{5}{4}$ (b) $\frac{6}{31}$ (c) -1 (d) $-\frac{1}{3}$
 (e) $-\frac{1}{5}$ (f) $\frac{9}{23}$
2. (a) $\frac{4}{3}$ (b) $-\frac{1}{9}$ (c) $-\frac{1}{10}$ (d) $\frac{1}{4}$
 (e) $-\frac{1}{14}$ (f) $\frac{1}{15}$ (g) $-\frac{97}{66}$ (h) $-\frac{21}{20}$
 (i) $\frac{7}{30}$ (j) $\frac{15}{14}$ (k) $-\frac{1}{12}$ (l) $\frac{45}{76}$
3. (a) $-\frac{15}{28}$ (b) $\frac{141}{280}$ (c) $-\frac{671}{910}$
4. (a) $-\frac{2}{7}$ (b) $\frac{1}{8}$ (c) $-\frac{61}{40}$ (d) $\frac{47}{40}$
5. $\frac{2}{9}$ 6. $\frac{11}{3}$ 7. $\frac{41}{33}$
8. $-\frac{23}{28}$ 9. $\frac{59}{30}$

Exercise 3.4

1. (a) $\frac{7}{10}$ (b) $-\frac{26}{45}$ (c) $-\frac{7}{16}$ (d) $\frac{8}{39}$
 (e) $\frac{28}{169}$ (f) $-\frac{1}{3}$ (g) $-\frac{13}{136}$ (h) $\frac{48}{403}$
2. (a) 0 (b) $-\frac{49}{169}$ (c) $-\frac{221}{36}$ (d) $-\frac{8}{15}$
 (e) $-\frac{4}{7}$ (f) $-\frac{403}{561}$ (g) 1 (h) $\frac{2}{3}$
3. (a) $\frac{22}{91}$ (b) $\frac{2}{117}$ (c) $-\frac{2}{5}$ (d) $-\frac{1}{5}$
 (e) $\frac{122}{9}$ (f) $\frac{44}{45}$ (g) $\frac{2}{3}$ (h) $\frac{21}{40}$
4. $-\frac{4}{17}$ 5. $-\frac{481}{731}$ 6. $\frac{39}{82}$ 7. 10
8. $-\frac{77}{25}$ 9. $-\frac{34}{15}$

Exercise 3.5

1. (a) 2.8 (b) 1.625 (c) 7.5 (d) 2.3125
(e) 3.0625 (f) 11.48
2. (a) 1.33... (b) 1.714285... (c) 0.18... (d) 2.86...
(e) 18.09... (f) 0.375
3. (a) $\frac{301}{25}$ (b) $\frac{13}{40}$ (c) $\frac{1913}{40}$ (d) $\frac{1081}{2500}$
(e) $\frac{401}{50}$ (f) $\frac{573}{400}$
4. (a) 2.4705 (b) 0.1250 (c) 0.6666 (d) 0.8750
(e) 0.6470 (f) 0.1500
5. (a) Terminating (b) Non-terminating (c) Terminating
(d) Terminating (e) Non-terminating (f) Non-terminating
6. Terminating
7. (a) $\frac{187}{200}$ (b) $\frac{789}{1000}$ (c) $\frac{253}{50}$ (d) $\frac{2839}{500}$
(e) $\frac{51}{50}$ (f) $\frac{193469}{20000}$
8. (a), (b) and (f)

Exercise 3.6

1. (a) 103.68 (b) 33.9552 (c) 280.254 (d) 218.9
(e) 36.2965 (f) 15.796 (g) 2670.6176 (h) 0.0021
2. (a) 686.925 (b) 87857.472 (c) 47.616
3. (a) 8.5 (b) 11.06 (c) 2.12 (d) 8.7
(e) 0.13 (f) 2.7 (g) 20.5 (h) 8.94
4. Rs 1971.25 5. Rs 1749.12 6. Rs 29347.55 7. 1.85
8. Rs 1080.625 9. 132601.5 kg 10. 55.8 litre 11. 3.75 km/hr
12. 13.7

Exercise 3.7

1. (a) 0.230 km (b) 270 hm (c) 8 year (d) 3000 litre
(e) 3.275 kg (f) 0.4 century
2. (a) 11250 mm (b) 0.02876 m (c) 13320 sec (d) 2.75 dag
(e) 0.00376 g (f) 20160 min (g) 1.28 kg (h) 3250 litres
(i) 875 dg 3. 58.8 m 4. 9.24 kg 5. 1125
6. 40 7. 422 8. 456 kg 9. 1682 hr
10. 38.725 kg 11. Rs 23667.12

MCQ - III

1. $\frac{-7}{6}, \frac{-49}{42}$ 2. $\frac{7}{12}, \frac{2}{3}$ 3. $\frac{29}{20}$ 4. $\frac{-29}{20}$
5. $\frac{48}{149}$ 6. $\frac{-3}{4}$ 7. 9470 8. $\frac{135}{47}$
9. $a \times (b + c)$ 10. terminating

Revision Exercise

1. (a) 7 (b) 6 (c) $-\frac{9}{4}$ (d) $\frac{8}{3}$
 (e) $-\frac{7}{4}$ (f) $\frac{64}{3}$
3. $\frac{3}{8}, \frac{7}{12}, \frac{2}{3}, \frac{3}{4}, \frac{5}{6}$ 4. $-\frac{7}{12}, \frac{4}{9}, -\frac{11}{24}, -\frac{5}{6}$
5. (a) $\frac{41}{10}$ (b) $\frac{235}{24}$ (c) $-\frac{11}{72}$ (d) $\frac{17}{24}$
6. $-\frac{2}{5}$ 7. $-\frac{3}{8}, -\frac{2}{8}, -\frac{1}{8}, \frac{0}{8}, \frac{1}{8}, \frac{2}{8}$
9. (a) 0.875 (b) -1.0625 (c) 3.142857... (d) -0.133...
 (e) -0.19230... (f) 0.4333...
10. (a) $\frac{63}{4}$ (b) $-\frac{411}{16}$ (c) $\frac{469}{20}$ (d) $\frac{809}{25}$
 (e) $\frac{9}{2000}$ (f) $\frac{7326}{25}$
11. (a) 4.064 (b) 0.192 (c) 480 (d) 3.2
12. (a) terminating (b) non-terminating recurring (c) terminating
 (d) terminating (e) terminating
 (f) non-terminating recurring
13. 868.275 km

Chapter 4

Exponents and Powers

Exercise 4.1

1. (a) 512 (b) 14641 (c) 125 (d) -1
 (e) 6561 (f) $\frac{64}{343}$
2. $576 = 2^6 \times 3^2$
3. (a) 6^3 (b) 10^3 (c) $\left(\frac{8}{25}\right)^2$ (d) $\left(\frac{-5}{8}\right)^3$
4. $74088 = 2^3 \times 3^3 \times 7^3$

Exercise 4.2

1. (a) $\left(\frac{-1}{17}\right)^3$ (b) $\left(\frac{-3}{2}\right)^4$ (c) $\left(\frac{11}{17}\right)^{13}$ (d) $\left(\frac{-99}{81}\right)^{243}$
 (e) $\left(\frac{274}{243}\right)^{1250}$
2. (a) $-\frac{16384}{2187}$ (b) $\frac{27}{343}$ (c) $\frac{16}{2401}$ (d) 1
 (e) $\frac{125}{512}$
3. (a) $\frac{128}{243}$ (b) $\frac{343}{2239488}$ (c) $\frac{11}{54}$ (d) $\frac{175}{36}$
 (e) $\frac{2}{15}$ (f) $\frac{16}{9}$

Exercise 4.3

1. (a) $\frac{32}{243}$ (b) $\frac{32}{243}$ (c) $-\frac{64}{125}$

2. (a) $\left(\frac{4}{7}\right)^{25}$ (b) $\left(\frac{-5}{6}\right)^{12}$ (c) $\left(\frac{3}{2}\right)^{14}$
3. (a) $\left(\frac{3}{4}\right)^5$ (b) $\left(\frac{-3}{13}\right)^3$ (c) $\left(\frac{-5}{6}\right)^{12}$ (d) $\left(\frac{-7}{3}\right)^7$
- (e) $\left(\frac{-3}{8}\right)^2$ (f) $\left(\frac{-3}{2}\right)^0 = 1$
4. (a) 1 (b) $\frac{-128}{2187}$ (c) $\frac{16}{25}$ (d) 0
5. (a) 1 (b) $\left(\frac{-17}{8}\right)^{21}$ (c) $\frac{4096}{81}$ (d) $\frac{5}{9}$
- (e) 1 (f) $\frac{1}{25}$ (g) $\frac{625}{81}$ (h) $\frac{9}{49}$
- (i) $\frac{21}{64}$
6. (a) 2 (b) $\left(\frac{15}{14}\right)^{48}$ (c) 128 (d) $\frac{-2}{2187}$
- (e) 1 (f) $\frac{1458}{625}$

Exercise 4.4

1. (a) $\left(\frac{1}{5}\right)^9$ (b) $\left(\frac{-2}{3}\right)^6$ (c) $\left(\frac{1}{2}\right)^4$
2. (a) 18 (b) $\frac{64}{27}$ (c) $\frac{32}{81}$
3. $\frac{-128}{19683}$ 4. $\frac{1}{7}$ 5. $\frac{-3}{2}$ 6. -1
7. 2 8. 36 9. (a) $\frac{5}{2}$ (b) $\frac{81}{100}$

Exercise 4.5

1. (a) 3.47×10^6 (b) 7.689×10^8 (c) 4.579×10^{-1} (d) 3.45×10^{-4}
2. (a) 7540000 (b) 0.000932 (c) 0.00000000000573
- (d) 3485000000000
3. $3 \times 10^8 \text{ m/s}$ 4. 12756000 m 5. $0.000000000067 \text{ Nm}^2/\text{kg}^2$
6. $1.602 \times 10^{-19} \text{ C}$

MCQ - IV

1. -8 2. $\left(\frac{-1}{9}\right)^3$ 3. 1 4. 4
5. $\frac{-1}{8}$ 6. 1 7. 4 8. 5
9. $9.4605 \times 10^{12} \text{ km}$ 10. $\frac{8}{27}$

Revision Exercise

1. (a) 256 (b) $\frac{128}{2187}$ (c) $\frac{15625}{117649}$ (d) 7776
2. (a) 25 (b) $\frac{16}{81}$ (c) 4
3. (a) $\frac{32}{243}$ (b) $\frac{2}{3}$ (c) 0 (d) $\frac{25}{16}$
4. (a) 5 (b) 0 (c) 3 (d) -13
5. $\frac{1}{18}$ 6. $\frac{25}{676}$ 7. $\frac{2187}{128}$
8. (a) $\frac{36}{49}$ (b) $\frac{16}{9}$ (c) $\frac{64}{15625}$
9. (a) 5.43×10^{-3} (b) 2.49218×10^5 (c) 2.63×10^{-7} (d) 4.529×10^{11}
10. (a) 0.0000243 (b) 61200000 (c) 0.00000000009025
(d) 801050
11. 2.56 m, 0.00256 km, 2.56×10^0 m, 2.56×10^{-3} km
12. 149600000000 km 13. $\frac{512}{125}$

Chapter 5

Algebraic Expressions

Exercise 5.1

1. (a) $x - 5$ (b) $7 + y - x$ (c) $x + y - z$ (d) $3x + y$
(e) $7y + 3$ (f) $\frac{x}{4} + y$
2. (a) The terms and their factors are : $2x^2$ (2, x), $-3y$ (3, y), 7 (7)
(b) The terms and their factors are : $-3xy$ (3, x, y), $5yz$ (5, y, z),
 $6xy$ (6, x, y)
(c) The terms and their factors are : x^2y (x, y), y^2x (x, y),
 x^2y^2 (x, y)
3. (a) $7a^3b^2c$ (b) $-2x^4y^3$ (c) $-24x^6y^6$ (d) $2t^{10}$
4. (a) $(-3xy^2, 13y^2x, 6xy^2), (5xy, 5yx, 10xy), (-17, 55)$
(b) $(10pqr, -7pqr), (-5p^2qr^2, 11p^2qr^2), (8pq^2r, pq^2r)$
5. (a) 23 (b) -12 (c) 28 (d) -84
(e) 31 (f) -122

Exercise 5.2

1. (a) $(3x^2y^2, 3y^2), (-16x^2y, -16y)$ (b) $(-5x^2, -5), (-11x^2yz, -11yz)$
(c) $4x^2y, 4y$
2. The degree and coefficient of each term are :
(a) $(3x^2, 2, 3), (-5xy, 2, -5), (-4y^2, 2, -4), (-11x^2y, 3, -11)$
degree of expression = 3
(b) $(23xy, 2, 23), (-4x^2y^2, 4, -4), (5x^2y^3, 5, 5), (-17, 0, -17)$
degree of expression = 5

- (c) $(a^2b^3, 5, 1), (-5a^2b, 3, -5), (7a^2b^2, 4, 7), (-11a^3b^2, 5, -11)$
 degree of expression = 5
 (d) $(x^2y, 3, 1), (-7x^3y^2, 5, -7), (3x^4y^3, 7, 3), (-7x^2y^4, 6, -7)$
 degree of expression = 7
 (e) $(12st^3, 4, 12), (-5s^2t^2, 4, -5), (6t, 1, 6), (-11s, 1, -11), (7st^2, 3, 7)$
 degree of expression = 4
 (f) $(x^2y^2, 4, 1), (3xy^2, 3, 3), (-x^2y, 3, -1), (2, 0, 2)$
 degree of expression = 4

3. Coefficients of x^3 in the terms are 7, $-2yz$, $-4z$, $-7y^2z^2$, $-11z^3$

4. (a) $15x^6 - 2x^3 + 7x^2 + 11x + 25$

(b) $6x^3y^2 - 17x^2y^2 - 5xy^2 - 11xy + 14y + 5$

(c) $14z^7 + 7z^6 - 5z^4 - 4z^3 + 11z^2 + 9$

5. (a) monomial (b) binomial (c) polynomial (d) monomial

(e) binomial (f) binomial (g) trinomial (h) monomial

(i) trinomial (j) polynomial

6. (a) quadratic (b) cubic (c) linear (d) quadratic

(e) cubic (f) linear (g) cubic (h) quadratic

Exercise 5.3

1. (a) $6a + 9b$

(b) $7ab$

(c) $16x + 1$

(d) a^2

(e) $6x^2y$

(f) $8x - 2y + 2z + 1$

(g) $3xy^2 + 2x^2y$

(h) $x^3 - 2x^2 - 9x + 8$

(i) $4x^2 + 9x - 8$

(j) $5x^2 + 8x + 11$

(k) $6x - y + ax^2$

(l) $5a + b$

(m) $\frac{51}{14}xy - \frac{31}{10}y - \frac{19}{35}x$

(n) $26x^2 + 22x + 58$

2. (a) 14

(b) 4

(c) 10

(d) 3

(e) -5

(f) 69

3. (a) $17xy$

(b) $-9a^2$

(c) $a - 2b$

(d) $2x^3 + 5x^2 - 2x + 1$

(e) $-3x^2 - 13xy + 5y^2$

(f) $-7x - 3$

(g) $-8w^2x^2 - 12y^2z^2 - 5$

(h) $\frac{11}{4}y + \frac{13}{6}z$

(i) $18p^2 - 6pq + 32q^2$

4. $l + 4m + 12n^2$

5. $-6x^2 + 2x + 3$

6. (a) $10y - 8x - 4$

(b) $-2x^2 + 2x - 2$

(c) $-y^2 - y + 12$

(d) $-6x^3 - 4x^2 + 5x - 20$

(e) $-3x^2 + 29xy + 14y^2$

7. $-14a - 10b - 4c$

8. $4x^3 + 8x^2 + 12$

9. $-10x - y + 27$

10. $4x^2 + x + 10$

11. $3a^2 + ab + 4, 64$

12. (a) $6x^2 + 4x + 13$

(b) $3x^2 + 41x + 21$

Exercise 5.4

1. (a) $\frac{80}{3}a^8b^3$ (b) $15x^3y^2z$ (c) $-84x^{14}a^7$ (d) $\frac{-7}{4}x^3y^2z$
(e) $-a^4b^3c^3$ (f) $-72x^3y^3z^2$ (g) $-126a^3b^4c^3$ (h) $-33a^2 - 22ab$
(i) $2ab - 2ac$ (j) $14a^2 + 27ab + 9b^2$ (k) $2x^3 - 4x^2 - 2x + 4$
2. (a) $24x^3y^4$ (b) $\frac{5}{32}x^7y^7$
3. (a) $-3xy^2 - 3y^3, -675$ (b) $16a^4 + 24a^2b + 9b^2, 100$
4. (a) $4xy^2$ (b) $-5ac^3$ (c) $\frac{-5}{3}xy$ (d) $6x^2$
(e) $-2xyz$ (f) $3 + 4m^2 - 2m$ (g) $12x^2 + 10xy - 2$
(h) $\frac{1}{2} + x + \frac{3}{2}x^3 - \frac{1}{2}x^4$ (i) $2a^2 - 2a + 2$
(j) $12a^2b^2 - 3a^2b + 5ab^2 + 4ab$

Exercise 5.5

1. (a) $x^2 + 5x + 4$ (b) $x^4 + 5x^2 + 6$ (c) $y^2 + 9y + 20$
(d) $4y^2 - 9$ (e) $16x^2 - 25$ (f) $144x^2 - y^2$
2. (a) $x^2 + 4xy + 4y^2$ (b) $144x^2 + 168xy + 49y^2$
(c) $16x^2 - 88xy + 121y^2$ (d) $4x^2 - 12xy + 9y^2$
(e) $4x^2 + 12xy + 9y^2$
3. (a) $4x^2 - 25$ (b) $64x^2 - 9$ (c) $-4ab$
(d) $49x^2 - 4y^2$ (e) $4624 - y^2$
4. (a) 9801 (b) 10609 (c) 496
(d) 996004 (e) 5625

MCQ - V

1. trinomial 2. 7 3. -12 4. $2x^3y^4z^2$
5. $2x^3y^3, -5x^3y^3$ 6. $-2x^3 - 6x^2 + 22x - 5$ 7. $-9x^2 + y^2 + 5xy - 4$
8. 10 9. $x + 5x^4y - 6x^3$ 10. $-15y^2$

Revision Exercise

1. (a) $x + 7$ (b) $2x + 5y$ (c) $\frac{xy}{5}$ (d) $x^2 + 10$
2. The terms, their degrees and coefficients are as given :
(a) $(4x^2, 2, 4), (-13x^4, 4, -13), (5x^3, 3, 5), (-11, 0, -11), (6x, 1, 6)$
(b) $(x^2y, 3, 1), (-11xy^2, 3, -11), (2x^3y^2, 5, 2), (-6xy, 2, -6)$
(c) $(x^5 \rightarrow 1, 5) (-6x^4 \rightarrow -6, 4) (3x^3 \rightarrow 3, 3) (-2x^2 \rightarrow -2, 2) (7x \rightarrow 7, 1) (-8 \rightarrow -8, 0)$
3. (a) $-2x5 + 4x4 + 9x3 - 11x + 23$; degree 5
(b) $11x6 + y4 + 5x3 - 2x2 - 3x$; degree 6
(c) $-4x3y3 + 4x2y2 + 12xy2 + 3xy - 3x$; degree 6

4. (a) $(4a^2b, -16a^2b)$, $(-2ab^3, 8ab^3, 6ab^3)$, $(12ab, ab)$, $(45, -17)$
 (b) $(8pq^2r, -5pq^2r)$, $(7pqr, 11pqr)$, $(-2pq^3, 7pq^3)$, $(-6pqr^3, 3pqr^3)$
5. (a) 62 (b) -2
6. (a) monomial (b) trinomial (c) binomial (d) trinomial
 (e) monomial (f) trinomial (g) binomial (h) monomial
7. (a) $3x^3 - 4x^2 + 9x - 24$ (b) $-30x^4 + 12x^3 + 66x^2$
 (c) $5y^2 - 2xy + 3x^2 - 8xy^2$ (d) $-6x^3 + 21x^2 - 32x + 21$
 (e) $-32x^3y^9z^5$ (f) $32p^3 - 48pq - 8p^2q + 12q^2$
 (g) $10x^4 - 2x^3 - 11x^2 + 7x - 12$ (h) $-3x^2 - 7x + 9$
 (i) $x^4 + 2x^3 - 5x^2 + 2x + 24$
8. (a) $-14x^2 + 17xy + 6y^2, -204$ (b) $-2ab^2c^3 - 8abc + 6a^2c, 170$
9. $7x^2 + 25x - 47$ 10. $-5x^3 + 2x^2 - 26x + 7$
11. $8x^3 - 16x^2 + 26x - 10, 42$
12. (a) $9x^2 - 24xy + 16y^2$ (b) $49t^4 + 70t^2u + 25u^2$
 (c) $25x^2 - 36$ (d) $-8xy$
13. (a) 9025 (b) 11236 (c) 992016 (d) 1280

Chapter 6

Linear Equations and Inequations

Exercise 6.1

1. (a), (b) and (c) 2. (b), (c) and (d)
 3. (c), (e), (f) and (g) 4. (a), (c) and (d)

Exercise 6.2

3. No
 4. (a) $2(2x + 5) = 48$ (b) $x + x + 1 = 35$
 (c) $x + x + 10 = 46$ (d) $\frac{2}{5}x - \frac{1}{5}x = 12$
 (e) $\frac{7}{8}x = 63$

Exercise 6.3

1. (a) 2 (b) -1 (c) 6
 2. (a) 25 (b) 14 (c) $\frac{1}{2}$ (d) $\frac{-41}{3}$
 (e) $\frac{405}{2}$ (f) $\frac{15}{7}$ (g) 6 (h) $\frac{45}{8}$
 3. (a) -1 (b) $\frac{13}{2}$ (c) $\frac{-9}{110}$ (d) 11
 (e) $\frac{51}{2}$ (f) $\frac{42}{19}$ (g) 2 (h) $\frac{-7}{9}$
 (i) -1 (j) 9 (k) 3 (l) 1
 (m) -1 (n) $\frac{9}{2}$ (o) -144

Exercise 6.4

1. 14, 20
2. $\frac{3}{7}$
3. 54 m, 20 m
4. 9 m, 23 m, 23 m
5. 10 yr, 7 yr
6. 75, 125
7. Rs 165, Rs 125
8. 10
9. 25
10. 11 yr, 13 yr
11. 15
12. 31, 38
13. 13, 37
14. 65° , 44° , 71°
15. 36
16. 44 yr, 17 yr
17. 15 yr
18. 12 yr, 40 yr

Exercise 6.5

1. (a) $x < 2$ (b) $x \geq 6$ (c) $x < -4$ (d) $x > -2$
(e) $x \leq 2$ (f) $x \geq -2$ (g) $x < -3$ (h) $x \leq -3$
(i) $x \leq 4$ (j) $x < -4$
2. 35
3. 9 cm

MCQ - VI

1. 22
2. 9
3. 16
4. 18
5. 13
6. 8
7. 27, 36
8. $x \geq 4$
9. $x > -3$
10. $\frac{3}{5}$

Revision Exercise

1. (a) $x = \frac{3}{4}y + 15$ (b) $x + 2x + 8 = 56$ (c) $x + 2x - 1 = 8$
2. (a) Yes (b) No (c) No
3. (a) $\frac{1}{2}$ (b) 7 (c) $\frac{47}{8}$ (d) $\frac{3}{7}$
4. 12 yr
5. 7
6. 63
7. $\frac{7}{13}$
8. 50 m, 25 m
9. 20, 30
10. Rs 80, Rs 60
11. 30, 18
12. (a) $x < \frac{5}{2}$ (b) $x > 4$ (c) $x \leq -3$ (d) $x < \frac{1}{5}$
13. 77

Chapter 7

Ratio, Proportion And Percentage

Exercise 7.1

1. (a) 2 : 7 (b) 1 : 20 (c) 3 : 10 (d) 1 : 8
(e) 3 : 2 (f) 49 : 73 (g) 1 : 4 (h) 20 : 1
2. (a) 3 : 8 (b) 1 : 3 (c) 3 : 5 (d) 7 : 1
(e) 1 : 8 (f) 1 : 4 (g) 9 : 19 (h) 2 : 5
(i) 20 : 1 (j) 720 : 7 (k) 1 : 8 (l) 1 : 4
3. (a) 9 : 14 (b) 5 : 6 (c) 3 : 7 (d) 3.2 : 5.2
4. 5 : 4
5. (a) 7 : 11 (b) 7 : 18 (c) 18 : 11
6. (a) 2 : 5, 4 : 10 (b) 8 : 6, 12 : 9 (c) 22:30, 33:45 (d) 9:2, 27:6

7. 8 8. 75 m 9. 675 10. Rs 2000
 11. 6, 8 12. 3:10, 3:8, Class VIII has a better result
 13. 259, 407

Exercise 7.2

1. 5.6 m 2. 24 cm
 3. (a) No (b) No (c) Yes (d) Yes
 4. (a) 135 (b) $x=16, y=64$ (c) 200 (d) 1
 5. 780 m 6. Rs 240
 7. (a) Rs 84000 (b) 25
 8. (a) 880 km (b) 40 hr 9. (a) 10 kg (b) 48
 10. Rs 670 11. Rs 300

Exercise 7.3

1. (a) 28% (b) $62\frac{1}{2}\%$ (c) $13\frac{3}{5}\%$ (d) $45\frac{5}{11}\%$
 (e) $68\frac{8}{9}\%$ (f) 80%
 2. (a) 345% (b) 73% (c) 80% (d) 404.5%
 (e) 23.1% (f) 6.2%
 3. (a) 150% (b) $26\frac{2}{3}\%$ (c) $85\frac{5}{7}\%$ (d) $66\frac{2}{3}\%$
 (e) 44% (f) $108\frac{1}{3}\%$
 4. (a) $\frac{11}{625}$ (b) $\frac{3}{4000}$ (c) $\frac{161}{20000}$ (d) $\frac{3}{500}$
 (e) $\frac{3}{25000}$ (f) $\frac{1}{8000}$
 5. (a) 0.00762 (b) 0.0005 (c) 0.00625 (d) 0.004
 (e) 0.00135 (f) 0.0072
 6. (a) Rs 140 (b) 75 g (c) 210 m (d) 225 l
 (e) Rs 845 (f) 24 min
 7. Rs 3750, Rs 8250 8. Rs 640
 9. 200 10. 360 g, 400 g, 240 g 11. 200

Exercise 7.4

1. (a) 180% (b) $55\frac{5}{9}\%$
 2. 75% 3. $106\frac{2}{3}\%$ 4. $37\frac{1}{2}\%$ 5. $83\frac{2}{3}\%$
 6. 48 kg
 7. (a) 50% (b) $33\frac{1}{3}\%$

8. $37\frac{1}{2}\%$ 9. $26\frac{2}{3}\%$
 10. (a) 25% (b) 25%

Exercise 7.5

1. (a) Profit Rs 50 (b) Loss Rs 150 (c) Profit Rs 50
 (d) Profit Rs 150
 2. (a) Profit 50% (b) Loss $12\frac{1}{2}\%$ (c) Profit 4%
 (d) Loss $16\frac{2}{3}\%$
 3. Profit Rs 60, 25% 4. Rs 200, 10% 5. Rs 200, $12\frac{1}{2}\%$
 6. Profit 50% 7. Loss 25% 8. 20%
 9. (a) Rs 53.50 (b) Rs 1356 (c) Rs 1200 (d) Rs 5720
 10. (a) Rs 400 (b) Rs 1000 (c) Rs 450 (d) Rs 300
 11. Rs 337.50 12. Rs 300 13. Rs 1200 14. Loss, Rs 50, $6\frac{1}{4}\%$
 15. Rs 750 16. $3\frac{1}{8}\%$ 17. Rs 2000, Rs 2250

Exercise 7.6

1. (a) Rs 192, Rs 992 (b) Rs 210, Rs 7210
 (c) Rs 400, Rs 10400
 2. (a) Rs 4000 (b) Rs 350 (c) Rs 4000
 3. (a) $2\frac{1}{2}$ year (b) 6 year (c) 7 year
 4. Rs 300 5. 12% 6. $12\frac{1}{2}\%$ 7. $12\frac{1}{2}\%$
 8. (a) Rs 23400 (b) 12 year
 9. Rs 9100 10. Rs 4125

MCQ - VII

1. 2 : 3 2. 18.3 g 3. Rs 96, Rs 320, Rs 120
 4. 100 5. 75 6. $\frac{19}{500}$ 7. 10%
 8. $8\frac{2}{3}\%$ 9. $4\frac{1}{2}$ year 10. $56\frac{1}{4}\%$ gain 11. 25 years
 12. $33\frac{1}{3}\%$

Revision Exercise

1. (a) 4:5 (b) 3.2:1 (c) 10:1 (d) 25:6
 (e) 12:5 (f) 1:8

2. (a) 60 (b) 32 (c) 12
3. (a) 4:3 (b) 4:1 (c) 1:320 (d) 6:1
(e) 2:1 (f) 8:3
4. Rs 300, Rs 400, Rs 500
5. (a) 1750 m (b) 7.2 cm
6. (a) 36 year (b) 24 year
7. (a) 72 km (b) 8 hr
8. (a) 37.5% (b) 375% (c) $56\frac{2}{3}\%$ (d) 37.5%
(e) 2.5% (f) $26\frac{2}{3}\%$
9. (a) $\frac{8}{25}$ (b) $\frac{59}{25000}$ (c) $\frac{49}{20}$ (d) $\frac{29}{40}$
10. (a) 5 kg (b) 90 (c) 3 m (d) Rs 18750
(e) $200\frac{3}{4}$ days (f) 100
11. (a) $62\frac{1}{2}\%$ (b) 20% (c) 30% (d) 6%
12. 25% 13. $16\frac{2}{3}\%$ 14. $y = 9600, z = 40000$
15. 240
16. 240 mango trees, 360 lemon trees and 1400 orange trees
17. (a) $29\frac{1}{31}\%$ (b) $51\frac{19}{31}\%$ (c) $6\frac{14}{31}\%$ (d) $12\frac{28}{31}\%$
18. 25% 19. Profit $33\frac{1}{3}\%$ 20. Profit 10% 21. 25%
22. (a) Rs 702 (b) Rs 7050
23. (a) Rs 800 (b) Rs 1800
24. Profit 20% 25. Profit $13\frac{2}{11}\%$ 26. Loss 10%
27. Loss 4% 28. Rs 10500
29. (a) Rs 900, Rs 5400 (b) Rs 96, Rs 8096
30. (a) Rs 1000 (b) Rs 2500
31. (a) 2 years 1 month (b) 4 years
32. 15 year 33. 6.25 % 34. Rs 15000, Rs 45000

Chapter 8

Lines and Angles

Exercise 8.1

1. (a) 60° (b) 131° (c) 11° (d) 157°
2. (a) 62° (b) 1° (c) 71° (d) 13°
3. (a) Complementary (b) Supplementary
(c) Complementary (d) Supplementary
(e) Complementary (f) Supplementary

4. (a) $(\angle AOB, \angle BOC), (\angle AOC, \angle COD), (\angle BOC, \angle COD), (\angle BOD, \angle DOA),$
 $(\angle AOD, \angle DOE)$
 (b) $(\angle AOB, \angle BOC), (\angle BOC, \angle COE), (\angle BOD, \angle DOE), (\angle COD, \angle DOA),$
 $(\angle COE, \angle EOA)$
 (c) $(\angle AOB, \angle COE), (\angle BOC, \angle EOA)$
5. 25°
6. $\angle POT = 27^\circ, \angle ROQ = 108^\circ, \angle QOS = 72^\circ, \angle SOP = 108^\circ$
7. $33^\circ, 57^\circ$
8. $80^\circ, 100^\circ$
9. $x = 36^\circ, \angle AOC = 49^\circ, \angle COD = 59^\circ, \angle BOD = 72^\circ$
10. (a) 105 (b) 70
11. 30°
12. (a) 50° (b) 35°
13. 15 14. 15
15. $c = 40^\circ, d = 50^\circ, e = 90^\circ, f = 40^\circ$

Exercise 8.2

1. $\angle 2 = 110^\circ, \angle 3 = 70^\circ, \angle 4 = 110^\circ, \angle 5 = 70^\circ, \angle 6 = 110^\circ, \angle 7 = 70^\circ,$
 $\angle 8 = 110^\circ$
3. $\angle 1 = 108^\circ, \angle 2 = 72^\circ, \angle 3 = 108^\circ, \angle 4 = 72^\circ, \angle 5 = 108^\circ, \angle 6 = 72^\circ, \angle 7 = 108^\circ,$
 $\angle 8 = 72^\circ$
4. (a) $x = 49$ (b) $x = 20$
5. (a) No (b) No (c) Yes (d) No
6. $x = 37, y = 143, z = 143$

MCQ - VIII

- | | | |
|-------------------------|--------------------------|---------------------------|
| 1. Complementary angles | 2. 45° | 3. $115^\circ, 65^\circ$ |
| 4. Can't say | 5. $100^\circ, 80^\circ$ | 6. Parallel |
| 7. Right Angle | | |
| 8. $30^\circ, 40^\circ$ | 9. $90^\circ, 90^\circ$ | 10. $50^\circ, 130^\circ$ |

Revision Exercise

- | | | | |
|---|-----------------------------------|-------------------------------|-----------------|
| 1. (a) 47° | (b) 69° | (c) 27° | (d) 1° |
| 2. (a) 60° | (b) 124° | (c) 91° | (d) 135° |
| 3. $83^\circ, 97^\circ$ | 4. $34^\circ, 56^\circ$ | 5. $x = 20$ | |
| 6. $\angle AOC = 30^\circ, \angle BOD = 54^\circ, \angle AOE = 108^\circ$ | 7. $89^\circ, 67^\circ, 24^\circ$ | | |
| 8. $x = 40$ | 9. $x = 20$ | 10. $26, 112^\circ, 68^\circ$ | |

Exercise 9.1

1. (a) 130° (b) 65° (c) 52°
2. (a) 65° (b) $x = 50^\circ, y = 80^\circ$
(c) $x = 70^\circ, y = 110^\circ$
3. $65^\circ, 46^\circ, 69^\circ$ 4. 90°
5. $90^\circ, 60^\circ, 30^\circ$ 6. $40^\circ, 60^\circ, 80^\circ$ 7. $50^\circ, 30^\circ, 100^\circ$
8. $\angle ADB = 95^\circ, \angle ADC = 85^\circ$ 9. $80^\circ, 70^\circ$ 10. $35^\circ, 65^\circ, 80^\circ$

Exercise 9.2

1. (a) No (b) Yes 2. 17 and 1
3. (a) True (b) True (c) True (d) True
4. (a), (c), (e) and (f)
5. 18 m 6. 98 cm 7. $\sqrt{1256} = 35.4$ 8. $x = 11$ m
9. 37 m
10. True 11. (a) 12. 40 m

MCQ - IX

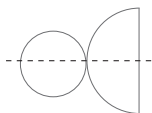
1. Median 2. 180° 3. $100^\circ, 60^\circ, 20^\circ$ 4. Greater
5. Acute 6. Longest Side 7. False
8. 13 m 9. 90° 10. $60^\circ, 300$

Revision Exercise

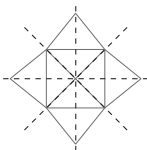
1. (a) No, sum of angles is less than 180° .
(b) Yes, sum of any two sides is greater than the third side.
(c) Yes, sum of angles is 180° .
(d) Yes, sum of any two sides is greater than the third side.
(e) No, sum of angles is greater than 180° .
(f) No, sum of two sides is smaller than the third side.
2. $\angle A = 45^\circ, \angle B = 60^\circ, \angle C = 75^\circ$ 3. $\angle TPS = 16^\circ$
4. $x = 70^\circ, y = 50^\circ$ 5. $x = 35, y = 70, z = 75$
6. $x = 50, y = 75, z = 105$ 8. $80^\circ, 30^\circ$
9. $\angle DCE = 92^\circ$
10. $x = 37, y = 53$

Exercise 10.1

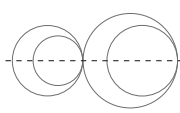
1.



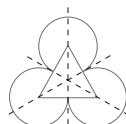
(a)



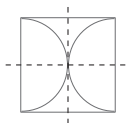
(b)



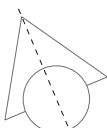
(c)



(d)



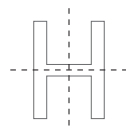
(e)



(f)

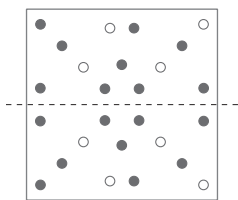


(g)

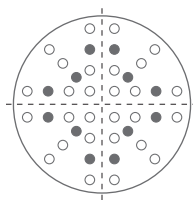


(h)

2.

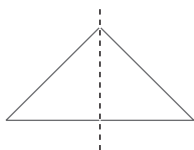


(a)

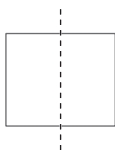


(b)

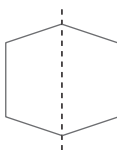
3.



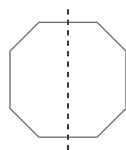
(a)



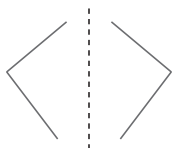
(b)



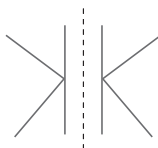
(c)



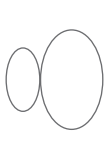
(d)



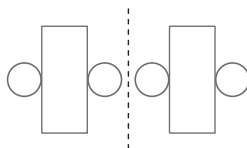
(e)



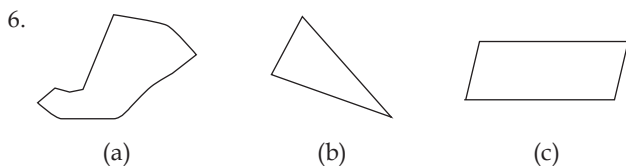
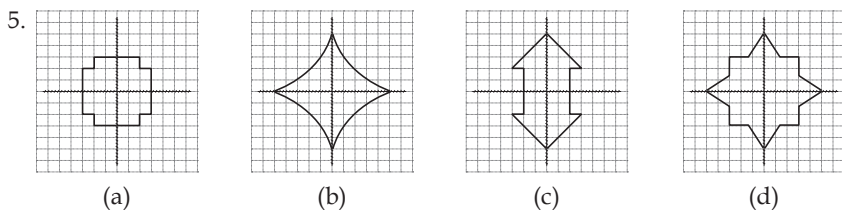
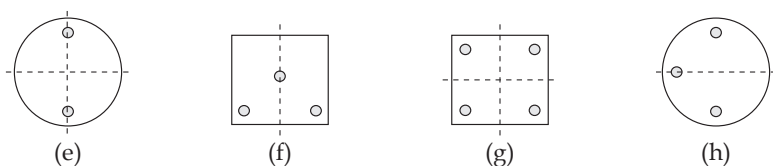
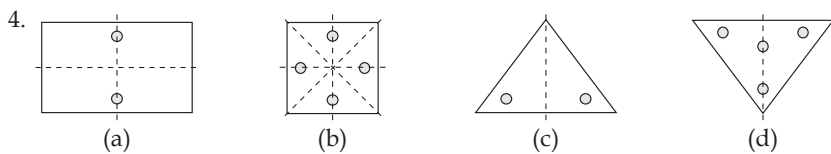
(f)



(g)



(h)



7. (a) 3 (b) 1 (c) 0 (d) infinite
 (e) 0 (f) 2 (g) 12 (h) 16
 (i) 2, 0, 1, 1

Exercise 10.2

1. (a) infinite (b) 3 (c) 3 (d) 4
 2. Z 3. a, d
 4. (a) 3 (b) 6 (c) 5
 5. (a) 5 (b) 2 (c) 2
 6. (a) 90° (b) 120° (c) 90° (d) 72°
 7. O, X 8. M, B, E
 9. (a) 180° (b) 90° (c) 60° (d) 72°

Chapter 11

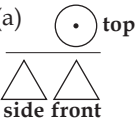
Representing 3D in 2D

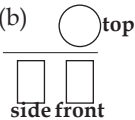
Exercise 11.1

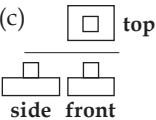
1. a) vertices 12, faces 8, edges 18
 b) vertices 6, faces 6, edges 10
 c) vertices 9, faces 9, edges 16
 d) vertices 8, faces 6, edges 12
 2. (a), (b), (c) 3. (b)

Exercise 11.2

- (a) 8 (b) 9 (c) 30 (d) 23
- (a) 56 cm^3 (b) 16 cm^3 (c) 9 cm^3 (d) 46 cm^3
- (a)  (b)  (c)  (d) 

(e)  (f) 
- (a)  top
side front

(b)  top
side front

(c)  top
side front

Chapter 12

Congruence

Exercise 12.1

- (a) they can completely superimposition each other.
(b) 110°
- (a) $\angle A$ (b) BC (c) $\angle B$ (d) CA
- (a) QR (b) PS (c) $\angle R$ (d) $\angle S$
(e) PR (f) QS
- (a) $PQ \cong AB$ (b) $\angle PQR \cong \angle XYZ$
(c) $ABCD \cong RSPQ$

Exercise 12.2

- (b) SAS, $\triangle AOB \cong \triangle COD$ (c) SAS, $\triangle ABC \cong \triangle PQR$
(d) SSS, $\triangle ABC \cong \triangle ADC$ (e) ASA, $\triangle ABC \cong \triangle ADE$
(f) RHS, $\triangle ABC \cong \triangle EDF$
- Yes, $OA = OB$, $\triangle OAQ = \triangle OBQ$, $OQ = OQ$ (RHS congruence rule)
- (a) Yes, ASA (b) Yes, ASA
- (a) PQ , QR (b) PQ (c) $\angle P$, $\angle R$
- $\angle PSQ \cong \angle PSR$ by ASA rule
- Yes, SAS
- $YQ = ZP$, $\angle YQZ = \angle ZPY$, $YZ = ZY$

Chapter 14

Perimeter and Area

Exercise 14.1

- (a) 40 cm (b) 18 cm (c) 18 cm (d) 20 cm
(e) 15 cm (f) 12 cm (g) 54 cm (h) 24 cm
- 25 cm 3. 7.1 cm 4. 7 cm 5. 75 m

6. 11.1 cm, 7.4 cm 7. 12.5 cm 8. Rs 594 9. 7.2 km
 10. Rs 24000 11. 10.5 cm, 7 cm 12. 10 cm, 15 cm, 5 cm
 13. 6.1cm 14. 45 cm 15. Rs 12800
 16. Shakeela covers 60m more

Exercise 14.2

1. (a) 71 cm (b) 34.5 cm
 2. (a) 45 cm (b) 10.5 cm (c) 1350 cm (d) 35.25 cm
 3. (a) 47 cm (b) 24 cm
 4. (a) 88 cm (b) 22 cm (c) 220 m (d) 66 dm
 5. (a) 7 cm (b) 21 dm (c) 17.5 dm (d) 10.5 mm
 6. Rs 3872 7. 132 m, 21 m 8. 40 cm 9. 40.5 cm
 10. Rs 5250 11. 157 m 12. 154 cm 13. 50000
 14. 84 m 15. 7 m 16. Rs 528 17. 1.54 km

Exercise 14.3

1. (a) 24.5 cm^2 (b) 14 m^2 (c) 9600 cm^2 (d) 1260 m^2
 2. (a) 24.01 cm^2 (b) $\frac{9}{25} \text{ m}^2$ (c) $\frac{121}{169} \text{ m}^2$ (d) 102400 cm^2
 3. (a) 46 dm^2 (b) 1.32 m^2
 4. 12 cm 5. 126 m 6. 144 cm^2 7. 432 m^2
 8. 55 cm^2 9. 6.5 cm 10. 4 cm 11. 240
 12. 144.8 m 13. Rs 2800 14. 30 m 15. 6 cm, 8 cm
 16. 16 cm 17. 1376 cm^2 18. 173 cm^2 19. Rs. 18225
 20. (a) 13.3 cm (b) 15 cm
 21. 12.5 cm
 22. (a) 60 cm^2 (b) 6000 cm^2
 23. 84 cm^2 24. 152.88 m^2 25. 32 26. 625 cm^2
 27. 135 cm^2

Exercise 14.4

1. 154 cm^2
 2. (a) 9.8 cm (b) 61.6 cm
 3. (a) 19.6 cm (b) 1207.36 cm^2 (c) Area becomes 4 times
 4. 326.85 cm
 5. 616 cm^2
 6. Circle, by 3993 cm^2 7. 4:9
 8. (a) 10.5 cm^2 (b) 129.714 cm^2 (c) 31.5 cm^2 (d) 28 cm^2
 9. 203 cm^2 10. 22.88 m^2 11. 19.796 cm 12. 52 m

Exercise 14.5

1. (a) 96 m^2 (b) Rs 480
2. Rs 11.25 3. Rs 2277 4. Rs 14244 5. 10300 m^2
6. (a) 875 m^2 (b) 154 m^2 (c) 721 m^2 (d) 44 m
7. Rs 74800 8. 61009 m^2
9. (a) 4750 m^2 (b) 90450 m^2 (c) Rs 2,28,000
10. 1300 cm^2 11. 2656 m^2

MCQ - IX

1. 15 cm 2. 200 cm^2 3. 88 cm 4. 264 m
5. 44 cm 6. 2604 m^2 7. 8 cm 8. 196 cm^2
9. 50 cm^2 10. 16:25

Revision Exercise

1. Rs 3033.84 2. 49 m 3. 40 4. 5 m
5. 44 cm , 14:11 6. 113.14 cm^2 7. 7550 cm^2 8. 200 cm^2
9. 24:25 10. 100
11. (a) 308 m^2 (b) 2700 m^2 12. 984 m^2 , Rs 49200

Chapter 15**Surface Area and Volumes****Exercise 15.1**

1. 6 cm 2. 6 cm 3. 8 cm 4. Rs 2880
5. (a) 240 cm^3 (b) 56250 cm^3 (c) 3000 cm^3
6. (a) 64 cm^3 (b) 3.375 dm^3 (c) 15625 mm^3 (d) 42.875 m^3
7. 10 cm 8. 156 kg 9. 72 10. 416

Exercise 15.2

1. 544 cm^2 2. Rs 376 3. 88 m^2 , Rs 440
4. 1000 cm^2 5. Rs 8640
6. (a) 856 cm^2 (b) 376 dm^2 (c) 502000 cm^2 or 50.2 m^2
7. 216 cm^2 8. 4750 cm^2 9. 260 m^2 10. Rs 1110

MCQ - XI

1. 180 cm^3 2. 300 m^2 3. 216 cm^2 4. 125
5. Rs 3960 6. 5 cm 7. 27 : 1 8. 4
9. 15.625 dm^3 10. 2 cm

Revision Exercise

1. 640 2. 27 times 3. 30 m^2 4. 12000 litre
5. 90 6. 10 7. 25886 cm^2 , 238521 cm^3
8. (a) 12 cm (b) 1728 cm^3 (c) 864 cm^2
9. (a) Rs 11200 (b) Rs 9000 10. 57.6 kg

Exercise 16.1

1. (a)

Marks	Tally Marks	Frequency
1		5
3		15
4		20
5		3
7		5
9		1
10		1
Total		50

(b)

Heights (cms)	Tally Marks	Frequency
145		9
146		4
147		3
148		9
149		14
150		14
151		3
152		4
Total		60

2. (a) 20 (b) 35 (c) 15 (d) 5

3.

Heights	Tally Marks	Frequency
141		4
142		1
143		1
147		1
148		2
149		4
150		4
151		1
152		1
153		1
Total		20

4.

Marks	Tally Marks	Frequency
30-40		8
40-50		3
50-60		2
60-70		6
70-80		5
80-90		7
90-100		9
Total		40

5.

Class interval	Tally Marks	Frequency
10 - 14		5
14 - 18		8
18 - 22		8
22 - 26		7
26 - 30		5
30 - 34		4
34 - 38		3
Total		40

6.

Class interval	Tally Marks	Frequency
15 - 20		16
20 - 25		12
25 - 30		11
30 - 35		1
Total		40

Exercise 16.2

1. 9
2. 9.625
3. 39.2
4. (a) highest marks = 100, lowest marks = 19
(b) Mean = 64.42 (c) Range = 81
5. 1800
6. (a) 9.33 cm (b) 3 (c) 3 (d) 14 cm
7. 27.5
8. 50
9. 9
10. 70.25 kg
11. 55
12. 7
- 13.

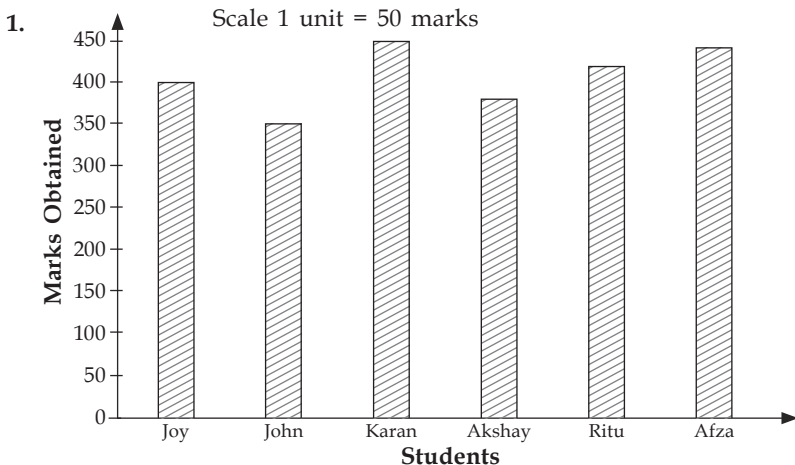
Marks	Numbers of Students
30-39	2
40-49	3
50-59	8
60-69	8
70-79	4
80-89	2
90-99	2
100-109	1

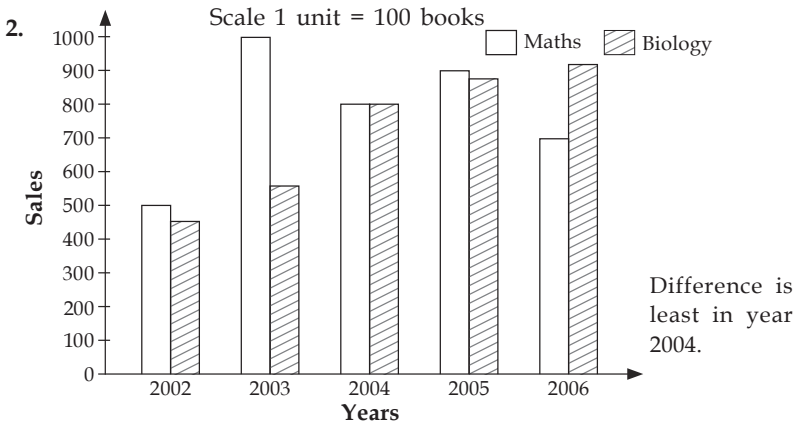
- (a) 100
- (b) 37
- (c) 63
- (d) 2
- (e) 8
- (f) 51, 54, 57
- (g) 5

Exercise 16.3

1. Mode = 28, Median = 21, No, they are not same.
2. Mean = 47, Mode = 12, Median = 13. No, they are not same.
3. Mode = 14, Median = 14
4. Mode = 16
5. Mean = 2.7, Median = 3, Mode = 3
6. Mode = 120
7. Median = 32, New Median = 35
8. Mean = 2.4, Median = 2.35, Mode = 2.2
9. a) False b) True c) False d) True
e) True f) False

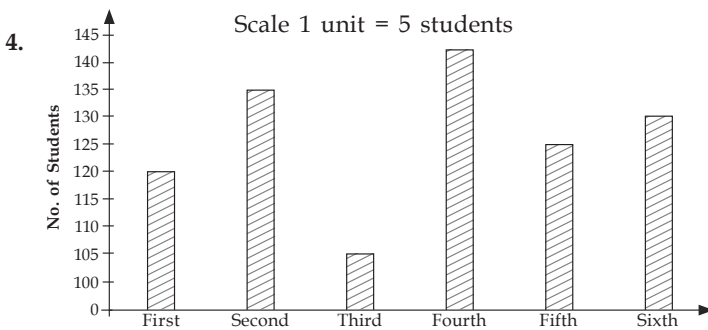
Exercise 16.4





3. (a) Dogs

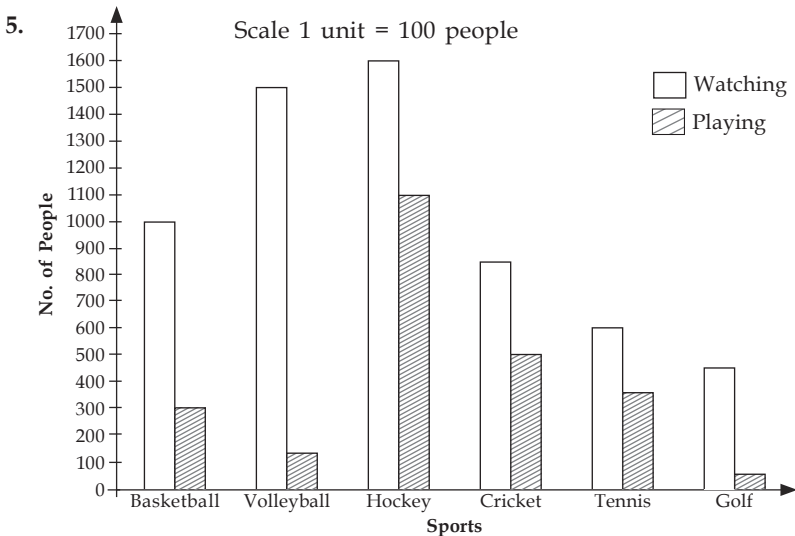
(b) 5



(a) Fourth class has maximum marks of students.

Third class has minimum numbers of students.

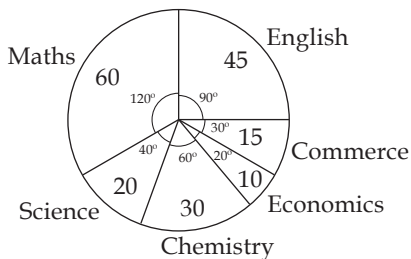
(b) 21 : 25



(b) Hockey

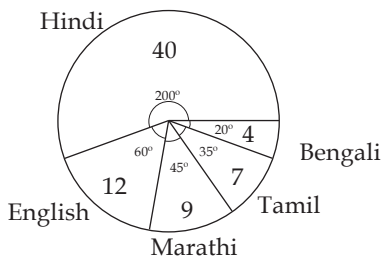
6.

Subject	Sector angle
English	90°
Maths	120°
Science	40°
Chemistry	60°
Economics	20°
Commerce	30°



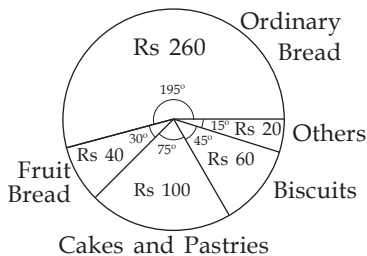
7.

Language	Sector angle
Hindi	200°
English	60°
Marathi	45°
Tamil	35°
Bengali	20°

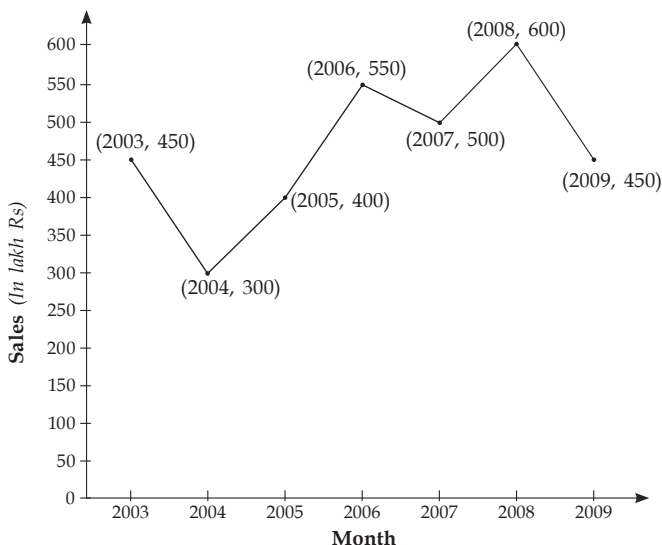


8.

Item sold	Sector angle
Ordinary bread	195°
Fruit bread	30°
Cakes and pastries	75°
Biscuits	45°
Others	15°



9.



Revision Exercise

1.

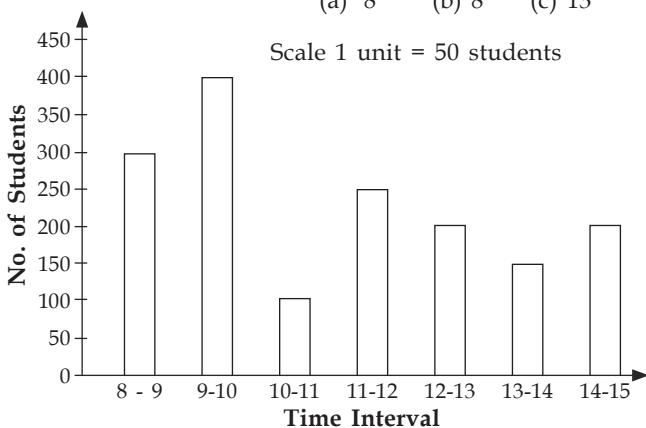
Value	Tally Marks	Frequency
12		4
13		12
14		9
15		2
16		2
17		1
Total		30

2 .

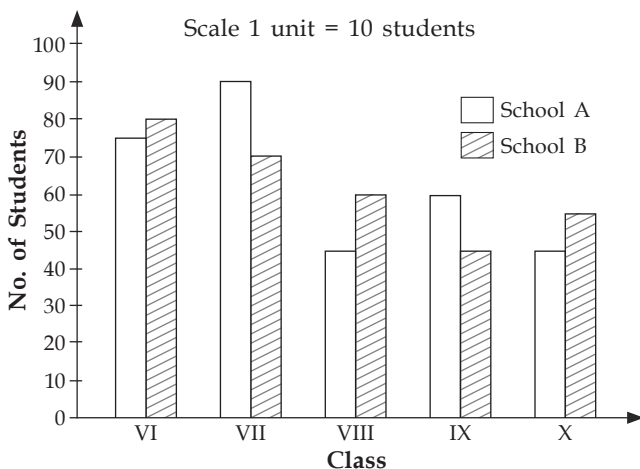
Class interval	Tally Marks	Frequency
1 - 3		5
3 - 5		10
5 - 7		13
7 - 9		9
9 - 11		3
Total		40

(a) 8 (b) 8 (c) 13

3.



4.

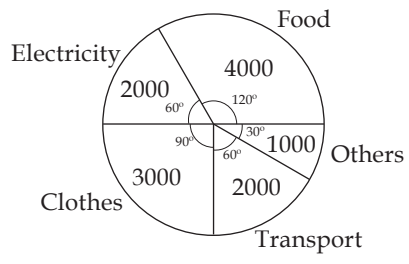


5. (a) The bar graph gives the production of coal, in million tonnes, in several states during the years 2006 -2007 and 2007-2008.
- (b) Bihar and M.P.
- (c) U.P. (d) U.P.
- (e) Bihar, West Bengal and M.P.

6. (a) 9.5 (b) 50 (c) 10.5
 7. 34.4 8. 154.5 9. 7
 10. (a) 56 (b) 53.5
 11. (a) 4 (b) 23
 12. (a) Mean = 5.4, Median = 6, Mode = 6
 (a) Mean = 44.7, Median = 36, Mode = 21

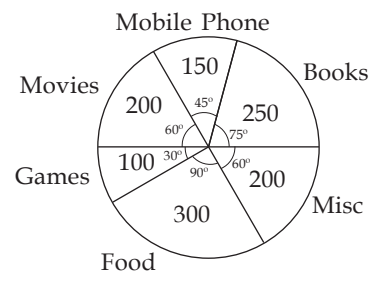
13.

Item	Sector angle
Food	120°
Electricity	60°
Clothes	90°
Transport	60°
Others	30°

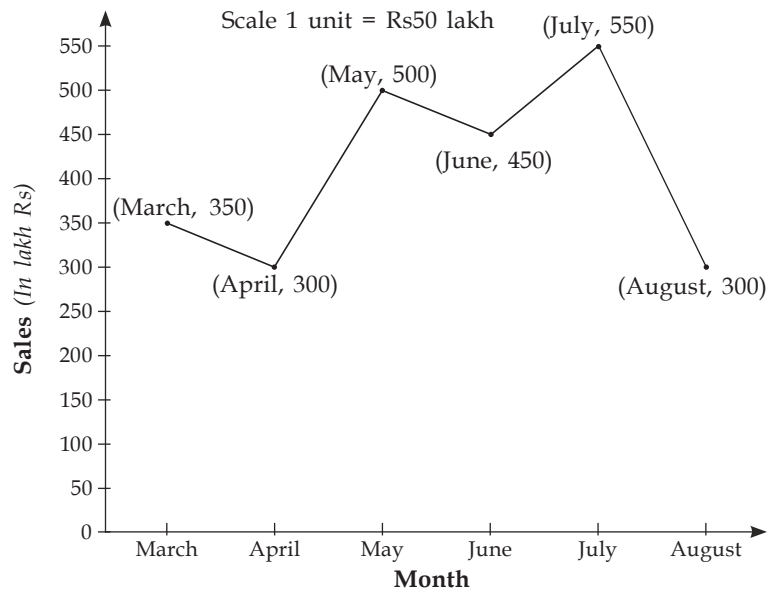


14.

Need	Sector angle
Books	75°
Mobile Phone	45°
Movies	60°
Games	30°
Food	90°
Misc	60°



15.



Exercise 17.1

1. (a) Certain (b) Possible (c) Possible (d) Impossible
 (e) Impossible (f) Impossible (g) Possible (h) Possible
 (i) Impossible (j) Possible

Exercise 17.2

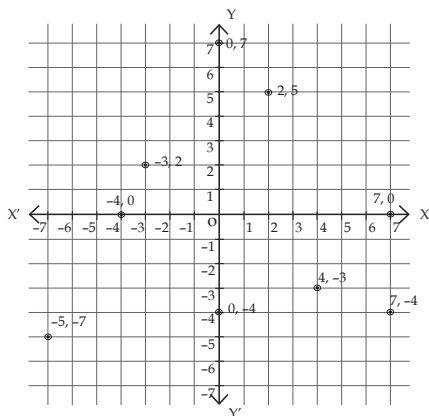
1. (a) $\frac{5}{11}$ (b) $\frac{6}{11}$
 2. (a) $\frac{3}{13}$ (b) $\frac{4}{13}$ (c) $\frac{6}{13}$
 3. (a) $\frac{1}{2}$ (b) $\frac{1}{2}$
 4. (a) $\frac{1}{6}$ (b) $\frac{1}{6}$ (c) 0 5. $\frac{1}{9}$
 6. (a) $\frac{2}{21}$ (b) $\frac{4}{21}$ (c) $\frac{5}{21}$ (d) $\frac{1}{3}$
 7. $\frac{1}{7}$
 8. (a) $\frac{3}{8}$ (b) $\frac{5}{12}$ (c) $\frac{1}{4}$ (d) $\frac{3}{8}$
 (e) $\frac{3}{4}$
 9. $\frac{2}{5}$ 10. $\frac{1}{2}$ 11. $\frac{1}{2}$
 12. (a) $\frac{2}{5}$ (b) $\frac{3}{5}$ 13. (a) $\frac{5}{6}$ (b) $\frac{1}{6}$
 14. (a) $\frac{1}{2}$ (b) $\frac{1}{3}$
 15. (a) $\frac{1}{3}$ (b) $\frac{2}{9}$ (c) $\frac{2}{9}$ (d) $\frac{1}{9}$

Revision Exercise

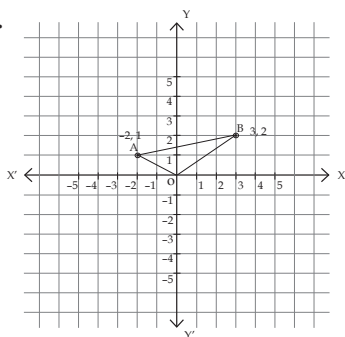
1. (a) Impossible (b) Possible (c) Possible
 (d) Impossible (e) Impossible (f) Certain
 2. (a) Less likely (b) Less likely (c) Equally likely
 (d) Equally likely (e) Equally likely (f) Highly likely
 3. (a) $\frac{1}{3}$ (b) $\frac{2}{5}$ (c) 0 (d) $\frac{11}{15}$
 4. (a) $\frac{1}{2}$ (b) $\frac{1}{2}$ (c) $\frac{1}{2}$ (d) $\frac{1}{2}$
 5. $\frac{1}{10}$
 6. (a) $\frac{2}{5}$ (b) $\frac{1}{2}$ (c) $\frac{1}{5}$ (d) $\frac{7}{10}$
 7. (a) $\frac{2}{13}$ (b) $\frac{4}{13}$ (c) $\frac{5}{13}$ (d) $\frac{2}{13}$

Exercise 18.1

1.

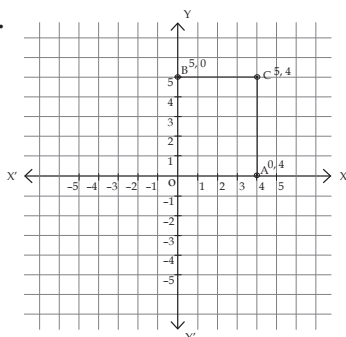


2.



The figure is triangle.

3.



4. a) (3, 1)

b) (7, 0)

c) (0, 7)

d) (-3, 0)

e) (-4, 3)

f) (0, -5)

g) (-2, -4)

h) (3, -6)

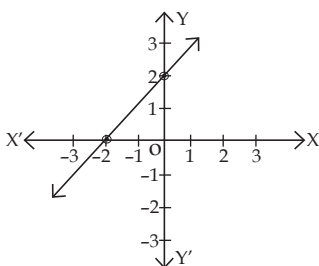
i) (7, -3)

j) (7, 6)

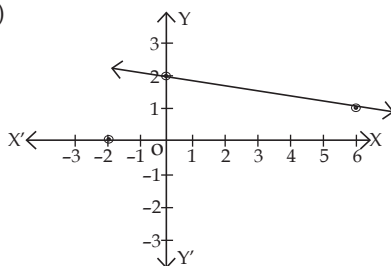
5. a) Yes

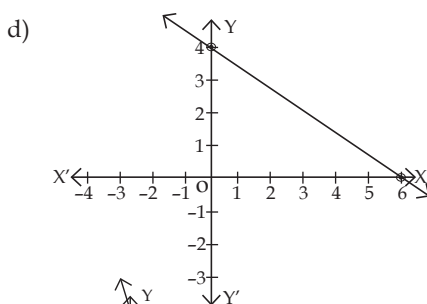
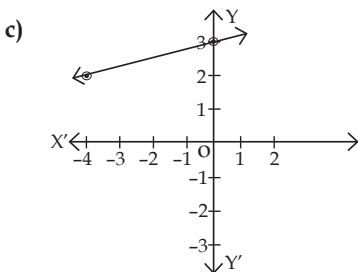
b) No

6. a)

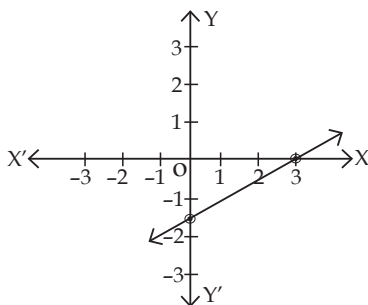


b)



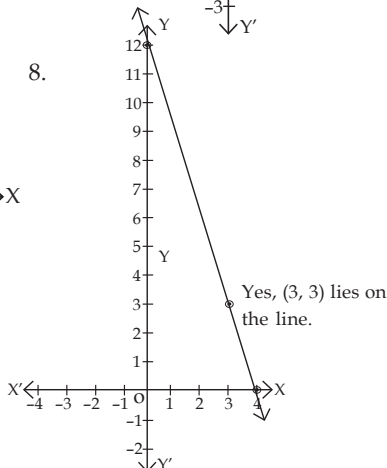


7.



- (a) $(-5, -4)$
(b) $(7, 2)$

8.



Chapter 19

Sets

Exercise 19.1

- (a) No (b) No (c) No (d) No
(e) No (f) Yes
- (a) True (b) True (c) False (d) True
(e) False
- (a) $A = \{6, 7, 8, 9, 10, 11, 12, 13, 14\}$
(b) $B = \{I, J, K, L, M, N\}$
(c) $C = \{-3, -2, -1, 0, 1, 2, 3, 4, 5\}$
(d) $D = \{P, E, R, M, U, T, A, I, O, N, S\}$
- (a) $A = \{x : x \text{ is an odd number and } 0 < x < 8\}$
(b) $B = \{x : x \text{ is an even positive number and } 0 < x < 13\}$
(c) $C = \{x : x \text{ is positive multiple of 4 and } 0 < x < 25\}$
(d) $D = \{x : x \text{ is square of } N \text{ and } 0 < N < 5\}$
- (a) No (b) Yes (c) Yes
- (a) Finite (b) Infinite (c) Finite (d) Infinite
- (a) 2 (b) 3 (c) 0 (d) 1
(e) 0 (f) 5
- $A = B = C, D = G = H, E = F$ 9. A and B, D and E .

Exercise 19.2

1. (a) $\{ \}, \{-1\}, \{0\}, \{1\}, \{-1, 0\}, \{-1, 1\}, \{0, 1\}, \{-1, 0, 1\}$
(b) $\{ \}, \{a\}, \{b\}, \{c\}, \{d\}, \{a, b\}, \{a, c\}, \{a, d\}, \{b, c\}, \{b, d\}, \{c, d\}, \{a, b, c\},$
 $\{a, b, d\}, \{b, c, d\}, \{a, b, c, d\}, \{a, c, d\}$
(c) $\{ \}, \{+\}, \{-\}, \{+, -\}$
2. (a) False (b) True (c) True (d) False
(e) False (f) True (g) False (h) False
3. (a) 7 (b) 32 (c) $\{ \}, \{a\}, \{b\}, \{c\}, \{a, b\}, \{b, c\}, \{a, c\}$
4. (a) $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ (b) $\{x : x \text{ is a triangle}\}$
(c) $\{x : x \text{ is a circle}\}$ (d) $\{x : x \text{ is a quadrilateral}\}$

Exercise 19.3

1. (a) $\{1, 2, 3, 4, 5, 7, 9\}$ (b) $\{1, 2, 3, 4, 5, 7, 8, 9, 10\}$
(c) $\{1, 2, 3, 4, 5, 8, 10\}$
2. (a) $\{5\}$ (b) $\{5, 8\}$ (c) $\{5\}$
3. (a) $\{x : x \text{ is an even natural number}\}$ or $\{2, 4, 6, 8, \dots\}$
(b) $\{x : x \text{ is a natural number}\}$ or $\{1, 2, 3, 4, \dots\}$
(c) $\{x : x \text{ is an odd natural number}\}$ or $\{1, 3, 5, 7, \dots\}$
(d) $\{x : x \text{ is a prime number}\}$ or $\{2, 3, 5, 7, 11, 13, \dots\}$
(e) $\{ \}$
(f) $\{x : x \text{ is an even prime number}\}$ or $\{2\}$
(g) $\{x : x \text{ is an odd natural number}\}$ or $\{3, 5, 7, 11, 13, \dots\}$
(h) $\{x : x \text{ is a natural number}\}$
4. (a) No (b) Yes (c) Yes
5. (a) $\{10, 11, 12, 13, 15, 16, 17, 18, 19\}$ (b) $\{10, 15\}$
(c) $\{10, 15, 16\}$ (d) $\{11, 13, 14, 17, 18, 20\}$ (e) $\{12, 19\}$
(f) $\{14, 20\}$ (g) $\{14, 20\}$
(h) $\{10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$ (i) $\{12, 19\}$
(j) $\{10, 11, 13, 14, 15, 16, 17, 18, 20\}$
(k) $\{11, 13, 14, 17, 18, 20\}$ (l) $\{14, 20\}$
7. (a) $\{5, 6, 7, 8, 9\}$ (b) $\{1, 2, 5, 6, 7, 8, 9\}$
(c) $\{1, 2, 3, 4\}$ (d) $\{1, 3, 4, 5, 6, 7, 9\}$
8. (a) $\{1, 2, 3, 4, 5, 6, 7, 8, 11\}$ (b) $\{2, 3, 7\}$ (c) $\{1, 8\}$

Exercise 19.4

1. 10 2. 16 3. 50 4. 24
5. 200, 50, 140 6. 125, 275, 75 7. English-40, Only English-15
8. 30

9. 19

10. (a) 26 (b) 16 (c) 22

11. (a) $\cup = \{a, b, c, d, e, f, g, h, i, j, k, l, m, n\}$

(b) $A = \{a, b, d, e, f, i\}$ (c) $B = \{a, c, d, g, k\}$

(d) $A \cup B = \{a, b, c, d, e, f, g, i, k\}$

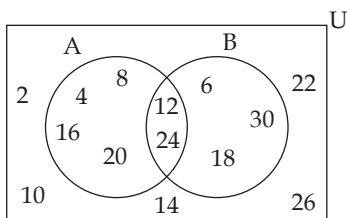
(e) $A' = \{c, g, h, j, k, l, m, n\}$ (f) $A \cap B = \{a, d\}$

(g) $B - A = \{c, g, k\}$ (h) $(A \cup B)' = \{h, j, l, m, n\}$

(i) $(A \cap B)' = \{b, c, e, f, g, h, i, j, k, l, m, n\}$

(j) $A - B = \{b, e, i, f\}$

12.



(a) $A' = \{2, 6, 10, 14, 18, 22, 26, 30\}$

(b) $B' = \{2, 4, 8, 10, 14, 16, 20, 22, 26, 28\}$

(c) $A \cup B = \{4, 6, 8, 12, 16, 18, 20, 24, 28, 30\}$

(d) $A \cap B = \{12, 24\}$

Chapter 20

Relation and Mapping

Exercise 20.1

1. $x = 2, y = 1$

2. $x = 3, y = -1$

3. (a) $R = \{(-1, 2), (0, 1), (2, 5)\}$ Range = $\{2, 1, 5\}$

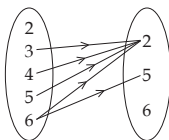
(b) $R = \{(1,2), (2,4), (3,6), (4,8), (5,10), (6,12), (7,14), (8,16), (9,18), (10,20)\}$

4. $R = \{(3, 2), (4, 2), (5, 2), (6, 2), (6, 5)\}$

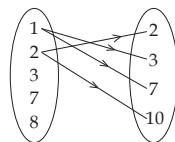
5. (a) It is a mapping.

(b) It is not a mapping.

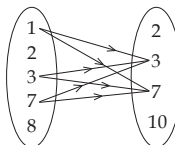
(c) It is a mapping.



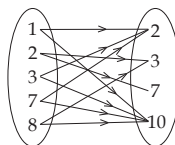
6. (a) $R = \{(1, 3), (1, 7), (2, 2), (2, 10)\}$
 Domain = $\{1, 2\}$, Range = $\{2, 3, 7, 10\}$



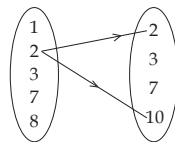
- (b) $R = \{(1, 3), (1, 7), (3, 3), (3, 7), (7, 3), (7, 7)\}$
 Domain = $\{1, 3, 7\}$, Range = $\{3, 7\}$



- (c) $R = \{(1, 2), (1, 10), (2, 3), (2, 7), (3, 2), (3, 10), (7, 2), (7, 10), (8, 3), (8, 7)\}$
 Domain = $\{1, 2, 3, 7, 8\}$, Range = $\{2, 3, 7, 10\}$



- (d) $R = \{(2, 2), (2, 10), (8, 2), (8, 3), (8, 7), (8, 10)\}$
 Domain = $\{2, 8\}$, Range = $\{2, 3, 7, 10\}$



Revision Exercise

- (a) $A = \{-2, -1, 0, 1, 2, 3, 4, 5, 6\}$

(b) $B = \{18, 27, 36, 45, 54, 63, 72, 81, 90\}$

(c) $C = \{T, R, I, G, N, O, M, E, Y\}$

(d) $D = \{2, 3, 5\}$
- (a) $A = \{x : x \text{ is a cube of a natural number less upto } 10\}$

(b) $B = \{x : x \text{ is one of the first ten multiples of } 3\}$

(c) $C = \{x : x \text{ is a letter of the word GEOGRAPHY}\}$

(d) $D = \{x : x \text{ is a symbol for the operations of addition, subtraction, division and multiplication}\}$
- (a) Subsets of A are : $\phi, \{2\}, \{3\}, \{5\}, \{2, 3\}, \{2, 5\}, \{3, 5\}, \{2, 3, 5\}$

(b) Subsets of B are : $\phi, \{m\}, \{n\}, \{o\}, \{m, n\}, \{m, o\}, \{n, o\}, \{m, n, o\}$

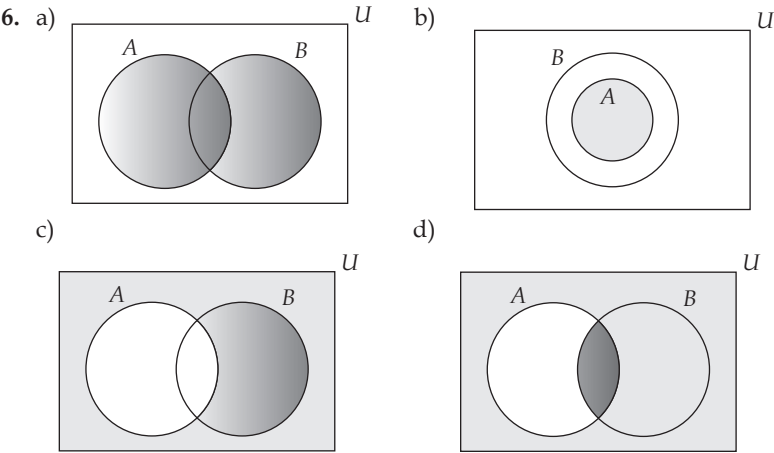
(c) Subsets of C are : $\phi, \{H\}, \{T\}, \{H, T\}$
- (a) $\{3, 5, 7, 9, 11, 13\}$ (b) $\{11, 13\}$

(c) $\{ \}$ (d) $\{7, 9, 11\}$

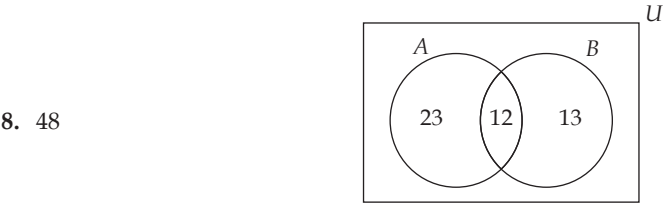
(e) $\{3, 5, 7, 9\}$ (f) $\{13\}$

(g) $\{7, 9, 11\}$ (h) $\{3, 5, 7, 9\}$

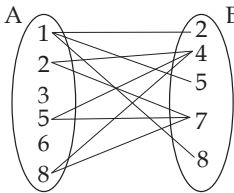
5. (a) $= \{1, 4, 9, 16\}$
 (b) $= \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19\}$
 (c) $= \{2, 3, 5, 7, 11, 13, 17, 19\}$
 (d) $= \{1, 5, 7, 11, 13, 17, 19\}$



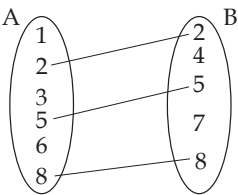
7. (a) $\{b, c, f, g, m, u\}$
 (b) $\{a, c, g, h, i\}$
 (c) $\{a, b, c, d, f, g, h, i, m, n, u\}$
 (d) $\{b, f, m, u\}$
 (e) $\{a, h, i\}$
 (f) $\{a, b, c, f, g, h, i, m, u\}$
 (g) $\{c, g\}$
 (h) $\{a, d, h, i, n\}$
 (i) $\{d, n\}$



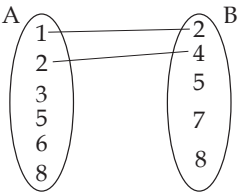
9. a) $R = \{(1, 2), (1, 5), (1, 8), (2, 4), (2, 7), (5, 4), (5, 7), (8, 4), (8, 7)\}$
 Domain of $R = \{1, 2, 5, 8\}$
 Range of $R = \{2, 5, 7, 8\}$



- b) $R = \{(2, 2), (5, 5), (8, 8)\}$
 Domain of $R = \{2, 5, 8\}$
 Range of $R = \{2, 5, 8\}$

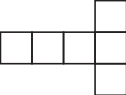
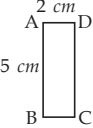


- c) $R = \{(1, 2), (2, 4)\}$
 Domain of $R = \{1, 2\}$
 Range of $R = \{2, 4\}$



Sample Paper

Section - A

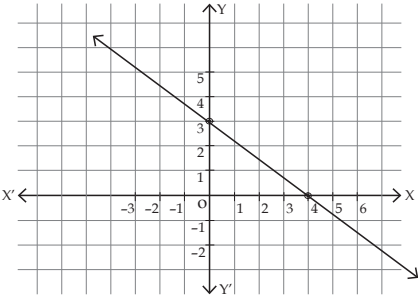
- | | | | |
|--|--|-----------|-------------------------|
| 1. 11 | 2. 6 | 3. 264 cm | 4. $A = \{2, 3, 5, 7\}$ |
| 5.  | 6. 5 | 7. 21 | 8. $\frac{3}{5}$ |
| 9. $\triangle ABC \cong \triangle RPQ$ | 10.  | | |

Section - B

- | | | | |
|-----------|-------------------|------------------------|-------------------|
| 1. 998001 | 2. $8x^2 - 18y^2$ | 3. $3\frac{1}{2}$ year | 5. $\frac{31}{4}$ |
|-----------|-------------------|------------------------|-------------------|

Section - C

- 1.

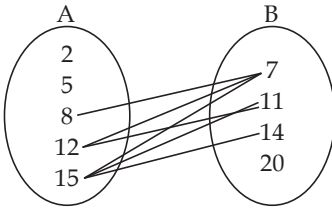


2. Loss, 4%

3. $x = 56, y = 54, z = 70$

4. 14:11 or 10 cm

6.



Domain = {8, 12, 15}

Range = {7, 11, 14}

7. 13 m

8. a) $\frac{16}{81}$

b) $\frac{3}{25}$

9. a) $7x^3 - 3x^2 - 4x - 4$

b) $5x + 6y - \frac{12}{5}$

10. 1000

Section - D

1. a) $808 m^2$ b) Rs 40400 c) $5192 m^2$ or

a) $198 m^2$ b) Rs 27800 c) $480 m^3$ 2. 63

3. mean = 64, median = 65, mode = 50

4. a) $A \cup B = \{1, 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 17, 19, 23, 24\}$

b) $A - C = \{2, 3, 5, 7, 23\}$

c) $B' \cap C' = \{5, 7, 9, 21, 22, 23\}$

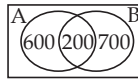
d) $A \cap (B \cup C) = \{2, 3, 11, 13, 17, 19\}$

e) $A \cup (B - C) = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 17, 19, 23, 24\}$

a) 200

b) 600

c) 700



or

5. a) Rs. 9900 b) Rs. 7920 c) Loss 12%

6. a) $\frac{9}{2}$ b) 153.6

Mental Ability Test

1. 129

2. 7

3. 32

4. 54

5. 34

6. 5

7. 32

8. 6

9. 57

10. $360 cm^2$

11. y

12. $3^3 + 3 + 3$



14. 66

15. $125^\circ, 55^\circ$

16. 40 km

17. $320 cm^2$

18. $112 cm^2$

19. 112

20. 62.4 litre

