Key book

Understanding Mathematics

SPECIAL EDITION

8

PROGRESS PUBLISHERS
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Exercise 1.1

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

2. (a) Negative (b) Positive (c) Positive
(d) Positive (e) Negative

3. (a) $\frac{31}{-4}$ (b) 4 (c) $\frac{12}{5}$
(d) $\frac{25}{14}$ (e) $\frac{4}{9}$

4. (a) $\frac{14}{24}, \frac{21}{36}, \frac{28}{48}$ (b) $\frac{-6}{14}, \frac{-9}{21}, \frac{-12}{28}$ (c) $\frac{20}{14}, \frac{30}{21}, \frac{40}{28}$
(d) $\frac{22}{30}, \frac{33}{45}, \frac{44}{60}$ (e) $\frac{2}{-3}, \frac{12}{-18}, \frac{24}{-36}$

5. (a) $\frac{14}{-63} = \frac{\boxed{-2}}{9} = \frac{-18}{\boxed{81}}$ (b) $\frac{-5}{-12} = \frac{\boxed{25}}{60} = \frac{-35}{\boxed{-84}}$
(c) $\frac{8}{21} = \frac{32}{84} = \frac{64}{168}$

6. (a) $\frac{12}{5} > \frac{15}{8}$ (b) $\frac{-3}{4} < \frac{5}{-6}$ (c) $\frac{9}{14} < \frac{5}{7}$

7. (a) $\frac{-11}{20} < \frac{7}{-15} < \frac{3}{10} < \frac{57}{30}$ (b) $\frac{-2}{3} < \frac{1}{2} < \frac{4}{7} < \frac{4}{5}$
(c) $\frac{-5}{10} < \frac{3}{5} < \frac{7}{10}$

8. (a) $\frac{8}{9} > \frac{10}{12} > \frac{4}{7}$ (b) $\frac{11}{12} > \frac{8}{9} > \frac{2}{3} > \frac{-3}{4}$
(c) $\frac{5}{12} > \frac{3}{8} > \frac{-2}{9}$

Exercise 1.2

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

2. (a) $\frac{7}{9}$ (b) $\frac{13}{7}, \frac{6}{11}$ (c) $\frac{2}{5}$ (d) 6

7. (a) $\frac{-97}{40}$ (b) $\frac{-4}{11}$ (c) $\frac{233}{140}$ (d) $\frac{4}{3}$
(e) $\frac{-113}{24}$ (f) $\frac{199}{30}$

8. (a) $\frac{-39}{56}$

Exercise 1.3

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

4. (a) $\frac{-1}{3}$ (b) $\frac{-11}{45}$ (c) $\frac{1}{7}$ (d) $\frac{-13}{18}$

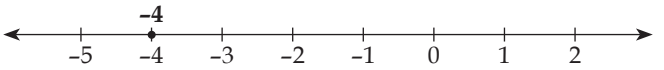
5. (a) $\frac{8}{3}$ (b) $\frac{-25}{3}$ (c) $\frac{-56}{3}$ (d) $\frac{64}{27}$

6. $\frac{-31}{36}$ **7.** $\frac{360}{119}$ **8.** $\frac{-9}{20}$

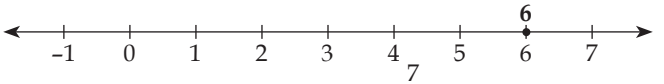
9. $\frac{-9}{8}$ **10.** $\frac{527}{224}$ **11.** $\frac{67}{120}$

Exercise 1.4

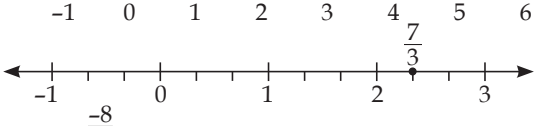
1. (a)



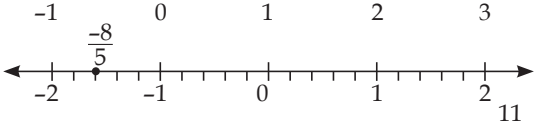
(b)



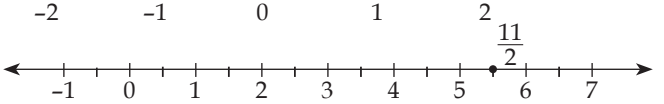
(c)



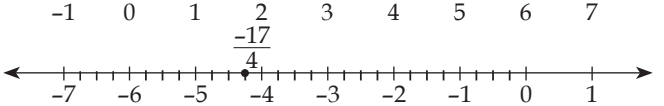
(d)



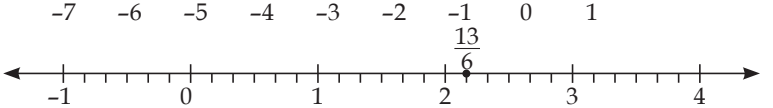
(e)



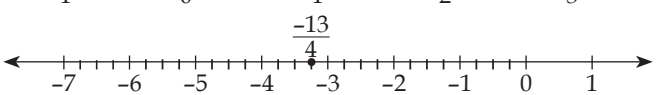
(f)



(g)



(h)



2. (a) $\frac{7}{4}$ (b) $\frac{-13}{5}$ (c) $\frac{-5}{6}, \frac{15}{6}$ (d) $-3, \frac{-5}{3}, \frac{1}{3}, \frac{11}{3}$

3. (a) $\frac{21}{10}, \frac{22}{10}, \frac{23}{10}$ (b) $\frac{71}{40}, \frac{72}{40}, \frac{73}{40}$ (c) $\frac{-2}{16}, \frac{-1}{16}, \frac{1}{16}$

4. (a) $\frac{151}{100}, \frac{152}{100}, \frac{153}{100}, \frac{154}{100}, \frac{155}{100}, \frac{156}{100}$ (b) $\frac{91}{120}, \frac{92}{120}, \frac{93}{120}, \frac{94}{120}, \frac{95}{120}, \frac{96}{120}$

(c) $\frac{-11}{15}, \frac{-10}{15}, \frac{-9}{15}, \frac{-8}{15}, \frac{-7}{15}, \frac{-6}{15}$

5. (a) $\frac{61}{160}, \frac{31}{80}, \frac{63}{160}$ (b) $\frac{-23}{40}, \frac{-19}{60}, \frac{-7}{120}$

(c) $\frac{-39}{60}, \frac{-19}{30}, \frac{-37}{60}$

Exercise 1.5

1. 1000, 350 by bus, 375 by bicycle

2. $56\frac{1}{3}m$ **3.** 270 **4.** $2\frac{19}{40}kg$ **5.** ₹123, 750

6. $\frac{29}{20}cm$ **7.** 12 days **8.** 560

MCQ - I

1. 1 **2.** $\frac{12}{-5}$ **3.** –6 **4.** $\frac{-8}{3}$

5. $\frac{7}{25}$ **6.** $\frac{53}{24}$ **7.** none of these **8.** $161\frac{7}{10}$

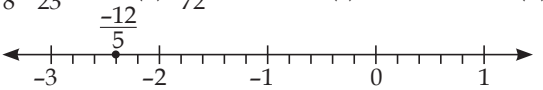
9. Sum **10.** $\frac{54}{67}$

Revision Exercise

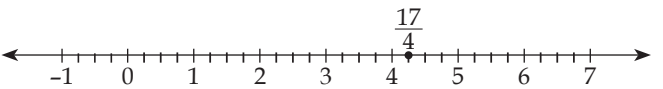
1. (a) False (b) False (c) False (d) False

2. (a) $\frac{13}{8}, \frac{5}{23}$ (b) $\frac{29}{72}$ (c) Closure (d) 1

6. (a)

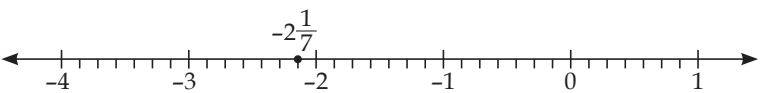


(b)



(c)

(d)



7. $\frac{161}{240}, \frac{162}{240}, \frac{163}{240}, \frac{164}{240}, \frac{165}{240}, \frac{166}{240}, \frac{167}{240}, \frac{168}{240}, \frac{169}{240}, \frac{170}{240}$

8. (a) $\frac{-67}{252}, \frac{-13}{126}, \frac{15}{252}, \frac{71}{504}$ (b) $\frac{27}{80}, \frac{17}{40}, \frac{41}{80}, \frac{89}{160}$

(c) $\frac{-103}{96}, \frac{-47}{48}, \frac{-19}{24}, \frac{-29}{48}$

9. (a) 0 (b) $\frac{-137}{150}$ (c) $\frac{55}{14}$

10. $\frac{-115}{36}$ **11.** $\frac{7}{8}$ **12.** 198

13. $\frac{34}{77}$ **14.** 1240 *km* **15.** 88 *ml*

Chapter 2 Exponents and Powers

Exercise 2.1

1. (a) $(-2)^5$ (b) $\left(\frac{3}{7}\right)^4$ (c) $\left(\frac{-2}{11}\right)^6$ (d) $\left(\frac{13}{6}\right)^5$

2. (a) Base = $\frac{-23}{56}$, Power = 6 (b) Base = $\frac{17}{19}$, Power = −5

(c) Base = −6, Power = 0 (d) Base = $\frac{21}{5}$, Power = 4

3. (a) $\left(\frac{3}{11}\right)^4$ (b) $\left(\frac{1}{7}\right)^3$ (c) $\left(\frac{7}{3}\right)^{14}$ (d) $\left(\frac{-15}{-2}\right)^8$

4. (a) $\left(\frac{11}{9}\right)^4$ (b) $\left(\frac{-1}{4}\right)^6$ (c) $\left(\frac{11}{7}\right)^3$ (d) $\left(\frac{4}{-13}\right)^{18}$

5. (a) $\frac{-27}{8}$ (b) $\frac{6561}{16}$ (c) 1 (d) 16807

6. (a) $\frac{256}{625}$ (b) 14641 (c) $\frac{2187}{823543}$ (d) $\frac{64}{729}$

7. (a) 1296 (b) $\frac{4121}{648}$ (c) $\frac{64}{27}$ (d) $\frac{162}{35}$

Exercise 2.2

1. (a) $\frac{4}{9}$ (b) $\frac{16}{81}$ (c) $\frac{729}{4096}$ (d) 1
(e) $\frac{27}{16}$ (f) $\frac{-27}{125}$ (g) $\frac{27}{125}$ (h) $\frac{81}{256}$
(i) $\frac{49}{400}$

2. (a) 312 (b) $\frac{1}{4096}$ (c) $\frac{16}{729}$

3. $\frac{-1331}{125}$ **4.** $\frac{32}{243}$ **5.** –7 **6.** 4

7. –6 **8.** 0 **9.** $\frac{-8}{343}$

10. (a) $\frac{9}{8}$ (b) $\frac{1}{72}$ (c) $\frac{-9}{8}$

11. $\left(\frac{1}{3}\right)^{26}$ **12.** $(16)^{12}$

13. (a) $\frac{3}{800}$ (b) 1 (c) 1728

Exercise 2.3

1. (a) 6.78×10^{-7} (b) 4.89×10^{-13} (c) 2.34×10^{22} (d) 7.82345×10^{5}

2. (a) .0000467 (b) 51206.84 (c) 0.00000009456
(d) 6200000

3. (a) $5.90 \times 10^{-8}\, m$ (b) $5.972 \times 10^{24}\, kg$
(c) $3.844 \times 10^{8}\, m$ (d) $1.67 \times 10^{-24}\, g$

4. (a) 36.1×10^{4} (b) $.000000498 \times 10^{4}$

5. (a) $3.5 \times 10^{4} > 6.7 \times 10^{3}$
(b) $2.567 \times 10^{-4} > 3.54 \times 10^{-6}$

6. $\frac{1}{20}$ times (approx) **7.** 15000 : 1

8. (a) 3.3607×10^{5} (b) 6.23256×10^{-3}
(c) 8.48865×10^{8}

9. (a) 8.44655×10^{7} (b) 8.5039×10^{-4}
(c) 7.72758×10^{7}

MCQ - II

1. 6.91×10^{-12} **2.** 5.8609×10^{8} **3.** 7 **4.** 0.0000989

5. 1 **6.** $\frac{1}{50625}$ **7.** –1 **8.** 0

9. 1 **10.** 27

Revision Exercise

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

2. (a) 6^4 (b) 7 (c) $\left(\frac{3}{5}\right)^6$ (d) .00018956

3. (a) Base = $\frac{-17}{6}$, Power = –4 (b) Base = –13, Power = 6
(c) Base = $\frac{45}{32}$, Power = –3 (d) Base = 8, Power = –15

4. (a) 2^{1-4n} (b) $\frac{225}{16}$ (c) $\frac{121}{25}$ (d) $\frac{729}{4096}$

5. (a) 625 (b) 3125 (c) 64 (d) $\frac{1}{16848}$

7. $\frac{-125}{1728}$ **8.** 14 **9.** 2

10. (a) $1.0174039342 \times 10^{7}$ (b) $7.34767309 \times 10^{22} kg$

(c) 6.23×10^{-23} (d) 1.674×10^{-27}

11. (a) 95120000 (b) $568319000000000000000000000 kg$

(c) 0.0000001567 (d) $.00000000000000000000000000199 kg$

12. (a) 1.31518×10^{11} (b) 9.581×10^{-4}

13. (a) 4.35113×10^{-2} (b) 5.3281×10^{6}

14. $\frac{1}{200000}$(approx) **15.** $\frac{1}{2}$(approx)

Chapter 3 Squares and Square Roots

Exercise 3.1

1. (a) perfect (b) odd (c) 2n (d) n^2

(e) odd (f) 120 (g) 8 (h) 7 (i) 32

2. (a) True (b) False (c) False

(d) False (e) True

3. (a) 4 (b) 9 (c) 4 (d) 1 (e) 9

(f) 6 (g) 4 (h) 9 (i) 5 (j) 0

4. 731, 5559

5. They end with digits 2, 3, 7 or 8 or have an odd number of zeros.

6. (a) $(29)^2 - 1 = 840$ (b) $(30)^2 - 1 = 899$

(c) $(32)^2 - 1 = 1023$ (d) $(48)^2 - 1 = 2303$

(e) $(53)^2 - 1 = 2808$

7. (a) 16 + 15 = 31 (b) 28 + 27 = 55

(c) 50 + 49 = 99 (d) 100 + 99 = 199

(e) 110 + 109 = 219

8. (a) 5^2 , 21^2 (b) 5^2 , 30^2 (c) 7^2 , 42^2

9. (a) $(5)^2 = 25$ (b) $(10)^2 = 100$ (c) $(15)^2 = 225$

10. (a) 81 = 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17

(b) 144 = 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 23

11. (a) $(19)^2 = 180 + 181$ (b) $(23)^2 = 264 + 265$

(c) $(17)^2 = 144 + 145$ (d) $(27)^2 = 364 + 365$

(e) $(31)^2 = 480 + 481$

Exercise 3.2

1. (a) 484 (b) 2304 (c) 12544 (d) 8836

(e) 998001 (f) 3249

2. (a) 1225 (b) 841 (c) 3025 (d) 9801

(e) 5625 (f) 2401

3. (a) Yes (b) No (c) No (d) Yes

4. (a) 6, 8, 10 (b) 5, 12, 13 (c) 14, 48, 50 (d) 28, 45, 53

(e) 6, 8, 10 (f) 16, 30, 34

5. (a) Yes (b) No (c) Yes (d) No

6. (a) $\frac{144}{289}$ (b) $\frac{529}{225}$ (c) $\frac{121}{49}$ (d) 99.6004

(e) 31.36 (f) 99.6004

Exercise 3.3

1. (a) 8 (b) 10 (c) 12 (d) 9

2. (a) 27 (b) 42 (c) 64 (d) 84

(e) 90 (f) 252 (g) 216 (h) 165

(i) 495 (j) 850

3. (a) 3, 21 (b) 2, 54 (3) 2, 98 (d) 7, 140

4. (a) 7, 6 (b) 5, 18 (c) 6, 66 (d) 7, 20

5. (a) 24 (b) 67 (c) 76 (d) 73

(e) 89 (f) 57 (g) 83 (h) 145

(i) 4032 (j) 746

6. 100489, 317 **7.** 9998244, 3162

8. 24, 68 **9.** 31, 63

10. (a) 5476 (b) 5625

Exercise 3.4

1. (a) 12.5 (b) 0.85 (c) 10.4 (d) 21.2

2. (a) 1.5 (b) 0.3 (c) 6.5 (d) 7.2

3. (a) 45 (b) 36 (c) 31 (d) 105

4. 5.6 *cm*

Exercise 3.5

1. 77 **2.** 182 **3.** 49 **4.** 24

5. 2.1 *m* **6.** $20\frac{1}{10}$ *m* **7.** 9.9 **8.** 5929, 77

9. 8 *cm*

MCQ-III

1. 256 **2.** $\frac{169}{289}$ **3.** 409600 **4.** 8189

5. 6 **6.** 53 **7.** 2 **8.** 16, 63, 65

9. 24.53 **10.** 52

Revision Exercise

1. (a) 529 (b) 2116 (c) $\frac{289}{16}$ (d) $\frac{121}{256}$

2. 6, 21, 45, 89

3. (a) 729 (b) 1849 (c) 11881 (d) 9409

4. (a) 5625 (b) 2401 (c) 13225 (d) 4761

5. (a) 16 (b) 32 (c) 9 (d) 12

6. (a) 36 (b) 98 (c) 216 (d) 72

7. (a) 124 (b) 321 (c) 4.01 (d) 67

8. 10004569 **9.** 99980001 **10.** 100, 80 **11.** 9, 97

12. 12.5 *cm* **13.** 1225 cm^2, 35 *cm*

14. 5929, 71, 77 **15.** 4800

Chapter 4 Cubes and Cube Roots

Exercise 4.1

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

2. (a) 357911 (b) 274.625 (c) $\frac{1331}{343}$ (d) –857375

(e) $\frac{-3375}{512}$

3. (a) 1728 (b) 6859 (c) 125000

4. (a) 9 (b) 3 (c) 1 (d) 4

(e) 2 (f) 6 (g) 8 (h) 3

(i) 4 (j) 5

5. (a) 10 (b) 2178 (c) 2 (d) 7 (e) 6

6. (a) 25 (b) 11 (c) 44 (d) 49 (e) 2

7. (a) $1^3 + 2^3 + 3^3 + 4^3 = (1 + 2 + 3 + 4)^2 = (10)^2 = 100$

(b) $1^3 + 2^3 + 3^3 + 4^3 + 5^3 = (1 + 2 + 3 + 4 + 5)^2 = (15)^2 = 225$

(c) $1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 = (1 + 2 + 3 + 4 + 5 + 6)^2 = (21)^2 = 441$

(d) $1^3 + 2^3 + 3^3 + \ldots\ldots + 10^3 = (1 + 2 + 3 + \ldots. + 10)^2 = (55)^2 = 3025$

Exercise 4.2

1. (a) 24 (b) –16 (c) 18 (d) –60

2. 6, 12 **3.** 6, 45 **4.** 6, 21952, 28

5. 21, 74088, 42

6. (a) $\frac{12}{7}$ (b) $\frac{-6}{13}$ (c) $\frac{5}{11}$ (d) $\frac{-9}{24}$

7. (a) 0.8 (b) –2.5 (c) 0.09 (d) –1.6

8. 6, 2.4

Exercise 4.3

1. (a) 42 (b) 20 (c) –9 (d) 12

2. (a) 24 (b) 69 (c) –18 (d) 65

3. 5.5 *cm* **4.** 11390.625 cm^3 **5.** 238.14 cm^2 **6.** ₹ 95331.20

7. 66 *cm* **8.** 200 **9.** 64

MCQ - IV

1. –1560896 **2.** $\frac{1728}{343}$ **3.** 4913 **4.** 18

5. 42 **6.** 2 **7.** –2.4 **8.** –12

9. 2.7 *cm* **10.** 7

Revision Exercise

1. (a) True (b) False (c) True (d) False
(e) True

2. (a) 50653 (b) 10077.696 (c) –134.217728
(d) $\frac{729}{2744}$ (e) 941192

3. 1000030000300001
1000001

4. (a) 18 (b) 14 (c) 20 (d) 22
(e) 25 (f) 28 (g) 30 (h) 35
(i) 40 (j) 100

5. (a) 7 (b) 15 (c) 17
(d) 43 (e) 97

6. (a) 0.12 (b) 0.1 (c) 0.15
(d) 16.6 (e) –5.4

7. 2, 20 **8.** 2, 16 **9.** 48 *cm*

10. 20 **11.** 6, 168 **12.** 18, 288

Chapter 5 Playing with Numbers

Exercise 5.1

1. (a) Divisible by 2 and 3
(b) Divisible by 2, 5 and 10
(c) Divisible by 3 and 5
(d) Divisible by 2, 3, 5 and 10
(e) Not divisible by 2, 3, 5 or 10

2. (a) Divisible by 3 and 6
(b) Divisible by none of 3, 6, or 9
(c) Divisible by none of 3, 6 or 9
(d) Divisible by 3, 6 and 9
(e) Divisible by none of 3, 6 or 9

3. (a) Divisible by 7 and 11
(b) Divisible by 7 and 11
(c) Divisible by 7
(d) Not divisible by 7 or 11
(e) Divisible by 7 and 11

4. (a) Divisible by 4
(b) Divisible by 4 and 8
(c) Divisible by 4
(d) Divisible by none of 4 or 8
(e) Divisible by 4

5.

	2	3	4	6	8	9	11
28460	✓	✗	✓	✗	✗	✗	✗
315029	✗	✗	✗	✗	✗	✗	✓
28314	✓	✓	✗	✓	✗	✓	✓
9252	✓	✓	✓	✓	✗	✓	✗
21340	✓	✗	✓	✗	✗	✗	✓
27148	✓	✗	✓	✗	✗	✗	✓
14256	✓	✓	✓	✓	✓	✓	✓

6. (a) 0 or 3 or 6 or 9 (b) 0 or 3 or 6 or 9
(c) 3 or 9 (d) 8

7. (a) A = 2, B = 9, D = 1 (b) A = 2, B = 5, C = 1
(c) A = 6, B = 2 (d) A = 8
(e) A = 2, B = 5

Exercise 5.2

1. (a) 12 (b) 99

2. (a) 0 (b) 22 (c) 0

3. (a) The number in general form is :
a × 100 + b × 10 + (a+2) = 101a + 10b + 2
The reversed number is (a+2) × 100 + b × 10 + a = 101a + 10b + 200
The difference = 198
Reverse of difference = 891
198 + 891 = 1089

(b) Subtract 165 from the final answer and divide the remainder by 100 to get the original number.

4. (a) 63, 71 (b) 324, 972 (c) 27, 37 (d) 96, 6144
(e) 55, 89

5. 124

Exercise 5.3

1. (a)

16	9	14
11	13	15
12	17	10

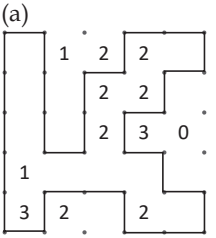
(b)

48	41	46
43	45	47
44	49	42

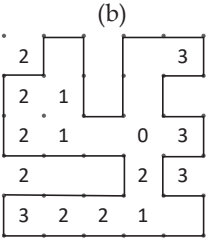
(c)

36	29	34
31	33	35
32	37	30

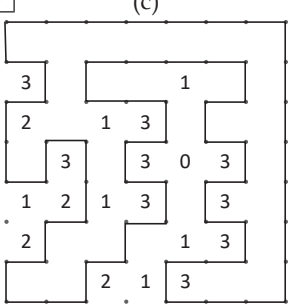
2. (a)



(b)



(c)



4. 1225 $\left(\frac{50 \times 49}{2}\right)$ **5.** 0 $[(x - x) = 0]$

Exercise 6.1

1. (a) $2x$, $-3y$, 6 ; 2, –3, 6 (b) x^2y, $11xy^2$, $-13xy$; 1, 11, –13

(c) $\frac{13}{2}xyz$, $7xy$, $\frac{-24}{5}yz$; $\frac{13}{2}$, 7, $\frac{-24}{5}$ (d) 15, $-8x^3$, y^3, $-27x^3y^3$; 15, –8, 1, –27

(e) $\frac{4}{3}x^2$, $-11x$, $\frac{-13}{3}$; $\frac{4}{3}$, –11, $\frac{-13}{3}$ (f) $125x$, $-15y$; 125, –15

2. (a) Binomial (b) Monomial (c) Polynomial (d) Binomial

(e) Trinomial (f) Polynomial

3. (a) $7xy^3 + 3x^2y - 8xy$, 4 (b) $\frac{-15}{4}x^{16} + 3x^{11} + 4x^6 + 67x$, 16

(c) $\frac{-13}{9}x^{49} + 76x^{33} - 12x^{23} + \frac{14}{5}x^{19}$, 49 (d) $-5x^4 + 18x^3 - 3x^2 + 12x + 17$, 4

(e) $-4x + 11$, 1 (f) $23x^2y^3 + 45xy^2 - 18xy + 35x$, 5

4. (a) $11x^2 + 15x - 6$ (b) $52x^3y^3 - 25xy^3 + 19x^3y - 18xy$

5. (a) $12x^4 - 26x^3 + 10x^2 - 2x - 84$ (b) $\frac{-2}{3}x^3 + \frac{54}{5}y^3 - \frac{41}{4}x^2y$

6. $4x^3 + 15x^2 + 12x + 34$ **7.** $-2x^4 + 5x^3 - 17x^2 - 60x + 24$

8. $-9x^4 + 13x^3 + 17x^2 - 11x - 20$ **9.** $-3x^3 + 33x^2 + 30x - 86$

10. $20x^3 - 24x^2 + 38x - 42$

Exercise 6.2

1. (a) $-24x^4y^2$ (b) $\frac{-28}{9}xy^7$ (c) $3x^3y^4z^2$ **2.** $-28x^3y^3$

3. (a) $12m^2n^3$ (b) $33a^3b^3$ (c) $15x^2 + 14xy - 8y^2$

4. (a) $6xy^4 - 14x^3y^2 + 28x^3y - 12xy^3$ (b) $21x^2 - 55y^2 + 2xy - 33x + 81y - 18$

(c) $-36x^3 - 40y^3 + 124xy^2$ (d) $4x^4 - 22x^3 + \frac{166}{5}x^2 - \frac{33}{5}x + \frac{48}{5}$

(e) $26x^2y - \frac{65}{4}xy^2$ (f) $24x^3 - 18x^2 + 45x + 54$

5. (a) $-6x^3 - 25x^2 + 11x$ (b) $\frac{9}{2}x^3 - \frac{79}{14}x^2 + \frac{131}{7}x - \frac{18}{7}$

(c) $6x^2 + 20xy - 11x - 46y + 12$ (d) $-10x^5 + 12x^4 - 38x^3 - 40x^2 - 12x + 2$

(e) $\frac{5}{2}x^4 - \frac{89}{6}x^3 + \frac{201}{4}x^2 - \frac{251}{3}x + 78$

6. (a) $\frac{-245}{48}$ (b) $\frac{-91}{18}$ (c) $\frac{-9}{64}$

7. (a) $60x^3 + 11x^2y - 25xy^2 - 6y^3$ (b) $\frac{3}{2}x^4y^6z^3$

(c) $84x^3 + 17x^2y - 44xy^2 - 12y^3$

8. $27x^3 + 135x^2 + 225x + 125$

9. $42xy^3 - 66x^3y - 36x^2y^2 + 10x^3 - 84y^3 + 26x^2y - 40xy^2 - 121x^2 - 77y^2 + 66xy$

10. $2x^3 + 18x^2 - 16x - 104$ **11.** $-3x^3 + 7x^2 - 8x + 27$

12. $4x^4 + 16x^3 - 104x^2 + 145x - 64$

Exercise 6.3

1. (a) $-16xy^2$ (b) $\frac{3}{4}$ (c) $-xyz$ (d) $\frac{36}{5}xy^2z^2$
(e) $-\frac{14}{3}ab^3$ (f) $\frac{10}{3}xy$

2. (a) $\frac{18}{5}x^2y + \frac{27}{5}y - 9x^3y$ (b) $-15a + 8b - \frac{9}{2}$
(c) $\frac{10}{3}mn^4 + \frac{14}{3}n^2 - \frac{8}{3}m^3$ (d) $5 - 12x + \frac{40y}{7x^2}$

3. (a) $x^2 - 3x + 2$, remainder = 0 (b) $4x^2 - 6x - 6$, remainder = 37
(c) $6x^2 + 17x + 4$, remainder = $52x - 2$
(d) $2x^2 + 3x - 2$, remainder = 0

4. (a) No (b) Yes (c) No (d) Yes

5. $2x^2 - 5x - 7$ **6.** a = 20, b = –24

Exercise 6.4

1. (a) $x^2 + 4x + 3$ (b) $y^2 + 2y - 15$ (c) $x^2 + 2x + \frac{8}{9}$
(d) $x^4 - x^2 - 12$ (e) $a^2 - 11a + 30$ (f) $\frac{x^2}{y^2} + \frac{5x}{y} - 14$

2. (a) $64x^2 + 80xy + 25y^2$ (b) $49x^2 - 42xy + 9y^2$
(c) $16x^4 - 40x^2 + 25$ (d) $\frac{4}{25}x^2 - \frac{2}{3}xy + \frac{25}{36}y^2$
(e) $0.04x^2 + 0.2xy + 0.25y^2$ (f) $\frac{16}{49}x^4 + \frac{5}{7}x^2y^2 + \frac{25}{64}y^4$
(g) $36x^2 - 25$ (h) $\frac{9}{16}x^4 - \frac{49}{9}y^2$

3. (a) $25x^2 + 4y^2 + 9z^2 - 20xy - 12yz + 30xz$
(b) $\frac{729}{8}x^3 - 81x^2y + 24xy^2 - \frac{64}{27}y^3$
(c) $125x^3 + 300x^2y + 240xy^2 + 64y^3$
(d) $\frac{9}{16}x^2 + \frac{36}{25}y^2 + \frac{25}{4}z^2 + \frac{9}{5}xy - 6yz - \frac{15}{4}zx$
(e) $27x^3 - 216x^2y + 576xy^2 - 512y^3$
(f) $1331x^3 + 2178x^2y + 1188xy^2 + 216y^3$
(g) $-343x^3 + 735x^2 - 525x + 125$
(h) $64x^2 + 49y^2 + 25z^2 - 112xy + 70yz - 80zx$

4. (a) $80xy$ (b) $40xy - 32zx$ (c) $1024x^3 + 1728xy^2$ (d) $2xy$

5. (a) 9025 (b) 11236 (c) 2916 (d) 7744
(e) 180 (f) 26000 (g) 4158 (h) 10088

6. (a) 830584 (b) 1191016 (c) 140608 (d) 300763

7. 85 **8.** 34 **9.** 1603

10. (a) $\frac{73}{36}$ (b) $\frac{-107}{216}$

Exercise 6.5

(a) $2x - x + 4x = 5x$ (add coeff. of x)

(b) $(-4y^2)^4 = 256y^8$ (laws of exponent)

(c) $\frac{4x - 6y}{2} = 2x - 3y$ (divide each term)

(d) $(z + 10)^2 = z^2 + 20z + 100$ (use identity)

(e) $4(2x + 7) = 8x + 28$ (multiply each term)

(f) $\frac{x + 9}{3} = \frac{x}{3} + 3$ (divide each term)

(g) $2x + 3x = 5x$ (addition of like terms)

(h) $(y - 5)^3 = y^3 - 15y^2 + 75y - 125$ (use identity)

MCQ-V

1. $\frac{-11}{5}y$ **2.** $3x^3y^3$, $8x^3y^3$ **3.** $2x^3 - 12x^2 + 28x - 30$

4. $\frac{-3}{2}xy^2$ **5.** 15129 **6.** $x^4 + 2x^2 - 48$

7. $-4x - 30$ **8.** 0 **9.** 13 **10.** 258000

Revision Exercise

1. (a) $x^2 - 2x - 15$ (b) $x^2 - a^2$ (c) $x^3 - 3x^2y + 3xy^2 - y^3$

(d) 7 (e) $-45y^2$

2. (a) False (b) False (c) True (d) True

3. $x^4 - 11x^2 + 6$

4. (a) $4x^2$, $-5x$, 11 ; 4, –5, 11 (b) $3x^2y$, $-18xy^2$, $13xy$; 3, –18, 13

(c) $-9ab^3$, $\frac{-11}{4}a^2b^2$, $5a^3b$; –9, $\frac{-11}{4}$, 5

5. (a) $3x^3 + 7x^2 + 19x + 7$ (b) $\frac{9}{4}x^4 + \frac{122}{35}x^3 + \frac{3}{4}x^2 - \frac{19}{2}x + \frac{32}{5}$

6. (a) $10x^3 + \frac{22}{3}x^2 + \frac{19}{4}x + \frac{85}{88}$ (b) $14x^3 - 43x^2 - 6x - 86$

7. (a) $-72x^4y^5$ (b) $8x^2 - 12x - 56$

(c) $6x^4 + 7x^3 - 15x^2 + 47x - 21$

(d) $x^6 - 8x^5 + 15x^4 - 13x^3 + 16x^2 - 5x + 2$

8. (a) $47x^2 - 71x - 15$ (b) $6x^4 - 78x^3 + 9x^2 + 37x - 42$

9. $6x^3 + 29x^2 - 40x + 12$; 315

10. (a) $Q = 2x^2 + 6x - 11$, $R = 0$ (b) $Q = 3x^2 + 11x - 6$, $R = 2x - 8$

11. (a) Yes (b) No

12. (a) $x^2 + 8x - 33$ (b) $16x^2 - 56xy + 49y^2$

(c) $9x^4 + 12x^2 + 4$ (d) $16x^2 - 9y^2$

(e) $x^4 - 13x^2 + 36$ (f) $27x^3 - 54x^2y + 36xy^2 - 8y^3$

(g) $125x^3 + 450x^2y + 540xy^2 + 216y^3$

(h) $64x^2 + 4y^2 + 25z^2 - 32xy - 20yz + 80zx$

13. (a) 7921 (b) 12544 (c) 4891 (d) 45000

(e) 884736 (f) 1092727

14. (a) $x^2(4x^3 - 11x) = 4x^5 - 11x^3$ (multiply each term)

(b) $(3x - 4) - (12x + 11) = 3x - 12x - 4 - 11$ (check sign while operating brackets)

(c) $\frac{6x-2}{2} = 3x - 1$ (divide each term)

(d) $(4x - 5)^2 = 16x^2 - 40x + 25$ (use identity)

Chapter 7 Factorisation

Exercise 7.1

1. (a) $4xy^3$ (b) $2 \times 3 \times 3 \times x \times x \times x \times y \times y$

(c) regrouping (d) factors

2. (a) $25x^2y = 1 \times 25x^2y = 25 \times x^2y = 25x \times xy = 25x^2 \times y = 25y \times x^2$
$= 5 \times 5x^2y = 5x \times 5xy = 5y \times 5x^2$

(b) $-7x^2y^2 = 1 \times -7x^2y^2 = -1 \times 7x^2y^2 = -7 \times x^2y^2 = -7x^2 \times y^2 = -7y^2 \times x^2$
$= 7x^2 \times -y^2 = 7y^2 \times -x^2 = -7xy \times xy = 7xy \times -xy = -7x^2y \times y$
$= 7x^2y \times -y = -7xy^2 \times x = 7xy^2 \times -x = -7 \times x \times x \times y \times y$

(c) $x^2y = 1 \times x^2y = x^2 \times y = x \times xy = x \times x \times y$

(d) $-4xy = -1 \times 4xy = 1 \times -4xy = -4 \times xy = 4 \times -xy = -4x \times y$
$= 4x \times -y = -4y \times x = 4y \times -x = -2 \times 2 \times x \times y = -2x \times 2y$
$= 2x \times -2y = 2 \times 2 \times -x \times y = 2 \times 2 \times x \times -y$

3. (a) $4xy^2$ (b) $5xy$ (c) $5ab^2$ (d) 1

4. (a) $9x^2y^2 = 1 \times 9x^2y^2 = 9 \times x^2y^2 = 9x^2 \times y^2 = 9y^2 \times x^2 = 9x \times xy^2$
$= x \times 9xy^2 = y \times 9x^2y = 9y \times x^2y = 9xy \times xy = 3 \times 3 \times x^2 \times y^2$
$= 3 \times 3 \times xy \times xy = 3xy \times 3xy = 3x \times 3xy^2 = 3y \times 3x^2y = 3x^2 \times 3y^2$

(b) $2abc = 1 \times 2abc = 2 \times abc = 2 \times a \times b \times c = 2a \times bc = 2b \times ac$
$= 2c \times ab = 2ab \times c = 2bc \times a = 2ac \times b$

(c) $6x^2y = 1 \times 6x^2y = 6 \times x^2y = 6x^2 \times y = 6y \times x^2 = 6xy \times x = 6x \times 6xy$
$= 2 \times 3 \times x \times x \times y = 2x \times 3xy = 2y \times 3x^2 = 2x^2 \times 3y = 2xy \times 3x$

(d) $-2yz^2 = 1 \times -2yz^2 = -1 \times 2yz^2 = -2 \times yz^2 = 2 \times -yz^2 = -2y \times z^2$
$= 2y \times -z^2 = -2z \times yz = 2z \times -yz = -2 \times y \times z \times z = -2yz \times z = 2yz \times -z$
$= -2z^2 \times y = 2z^2 \times -y$

5. (a) $2 \times 2 \times 2 \times 11 \times x \times x \times (2x - 3y)$

(b) $2 \times 2 \times 2 \times 2 \times 5 \times y \times (2x + 3y)$

(c) $x \times x \times x \times y \times y \times y \times y$

(d) $-3 \times 5 \times x \times y \times (x + y)$

6. (a) $10xy^2z\ (12xz^2 + 5 - 3x^2yz)$ (b) $27(2ab^3 - 3bc^2 + a^2c^3)$

(c) $5pr\ (25q^2 + 9r - 18p^2q^2r)$ (d) $12m^2n^2\ (m^2 - 3mn + 4n)$

7. (a) $3\ (-5x + 2y)$ (b) $2ab\ (2b + 5a)\ (3 - a^2b^3)$

(c) $(3x - y)\ (3x + 4)$ (d) $3\ (2x^2 - 1)\ (6xy^2 - 9z + 10x^2yz^2)$

8. (a) $2\ (6x - 2y + 9z)$ (b) $4xy\ (11x - 7y^2 + 4z)$

(c) $9x^2\ (1 - 3x + 4x^3)$ (d) $11m^3n^2\ (7m - 1 + 3n^2)$

Exercise 7.2

1. (a) $20xy^3\ (4xy^2 - 1)$ (b) $5m^2n^2\ (45m - 35n - 18m^2)$

(c) $pq\ (64q + 25p)$ (d) $4abc\ (11c - 6ac^2 + 15ab^2)$

2. (a) $(5x - 8y)(5x + 8y)$ (b) $\left(\frac{4}{3}u - \frac{5}{8}v\right)\left(\frac{4}{3}u + \frac{5}{8}v\right)$

(c) $2\,(5x - 3)(5x + 3)$ (d) $(9q^2 + 25r^2)(3q - 5r)(3q + 5r)$

(e) $(1 - 2m)(1 + 2m)(1 + 4m^2)$ (f) $12\,(3a - 4)(3a + 4)$

3. (a) $(6x - 5)(6x - 5)$ (b) $(7y + 3)\ (7y + 3)$

(c) $8(3m - 2)(3m - 2)$ (d) $(8x^2 + 3)(8x^2 + 3)$

(e) $\left(\frac{7}{5}p - 1\right)\left(\frac{7}{5}p - 1\right)$ (f) $\left(\frac{5}{9}y - \frac{9}{5}z\right)\left(\frac{5}{9}y - \frac{9}{5}z\right)$

4. (a) $(x - 3)(x - 5)$ (b) $(m + 6)(m - 3)$

(c) $(x + 9)(x + 5)$ (d) $(x - 8)(x + 2)$

(e) $(z^2 + 14)(z^2 - 2)$ (f) $(y^2 - 11)(y^2 + 2)$

5. (a) $(a - 18)(a + 3)$ (b) $(y - 9)(y - 8)$

(c) $(m + 6)(m - 2)$ (d) $(z + 11)(z + 3)$

(e) $(x - 16)(x - 4)$ (f) $(p + 12)(p - 3)$

6. (a) $12xy^2(2x^2 + 3y + 4x)$ (b) $45(9m^2 - 11n^2)$

(c) $(11 - 2y)(11 - 2y)$ (d) $6(2a^2 - 3b)(2a^2 - 3b)$

(e) $(y + 10)(y + 5)$ (f) $(x^2 - 12)(x^2 + 6)$

(g) $(x + 20)(x + 5)$ (h) $(x - 11)(x - 5)$

(i) $3(16x^2 + 25y^2)(4x - 5y)(4x + 5y)$ (j) $(b - 1)(b + 1)(2b - 1)$

(k) $2(3x - 5)(3x - 5)$ (l) $(5y - 2 - 9x)(5y - 2 + 9x)$

Exercise 7.3

1. (a) $11xy^2 - 16y^2 + 5x$ (b) $8x^2y^3 - \frac{7}{2}y - \frac{9}{2}x^2y$

(c) $2x - \frac{1}{3}$ (d) $y(6 - 25xy)$

2. (a) $x - 3$ (b) $2x - 5$

(c) $(3x + 5y)(9x^2 + 25y^2)$ (d) $(2x + 3y)(2x - 3y)$

3. (a) $4x - 5y$ (b) $x - 6$ (c) $y - 3$ (d) $2(y - 3)$

MCQ - VI

1. $12xy^2z^2$ **2.** $24 \times x^2 \times y$ **3.** $(x - 16)(x + 3)$
4. $(3x - 1)(2x - 1)(2x + 1)$ **5.** $4(12x + 5y)$
6. $p + q = a$, $pq = b$ **7.** $(x - y)(x + y)(x^2 + y^2)$
8. $(x^3 - 9)^2$ **9.** $4(2y - 3)^2$ **10.** $(3x - 14)(x + 1)$

Revision Exercise

1. (a) HCF of constants × HCF of variables
(b) $2 \times 19 \times x \times x \times y \times y \times y$ (c) $2x\ (x - 3)\ (2y - 3xz)$ (d) 12

2. (a) $30x^4(5y - 1)$ (b) $44xy(x - 6y)$
(c) $6x(2x - 3y)(3 + 4y)$ (d) $20a^3b\ (10a - 3)$

3. (a) $20x(8x^2 + 5x - 9)$ (b) $36xy^2(-11xy - 3 + 6x^2)$
(c) $3x(x - 12)(3x + 2)$ (d) $y^2z^2\ (y - z - 1)$

4. (a) $b(a - 1)(6a - 6 - 5b)$ (b) $2(5m + 4n)(4m + 9n)$
(c) $(3x - y)(y + 1)$ (d) $m(5 + 2n)(2m - 3n)$

5. (a) $(a - 4)(a + 4)(a^2 + 16)$ (b) $2x(x - 2y)(x + 2y)(x^2 + 4y^2)$
(c) $\left(\frac{11}{12}x - \frac{9}{8}yz\right)\left(\frac{11}{12}x + \frac{9}{8}yz\right)$ (d) $5xy^3z^4(5xy - z)(5xy + z)$
(e) $(8ab - 3cd)(8ab + 3cd)$ (f) $(1 - 5y)(1 + 5y)$
(g) $2x^4(7x - 12)$ (h) $3x^4(-x^2 + 5)$ (i) $n(7m - 3n)$

6. (a) $-16x^2(x^2 - 2x - 5)$ (b) $(8a + 7)(8a + 7)$
(c) $(17y + 1)(17y + 1)$ (d) $\left(\frac{5}{6}z - \frac{3}{4}y\right)\left(\frac{5}{6}z - \frac{3}{4}y\right)$
(e) $4y(y - 10)(y - 10)$ (f) $(4x - 7y)(4x - 7y)$
(g) $(x - 10)(x - 10)$ (h) $(x + 18)(x + 5)$
(i) $(x - 21)(x + 4)$

7. (a) $(x - 10)(x - 8)$ (b) $(x + 6)(x - 5)$
(c) $(x + 6)(x - 3)$ (d) $(x + 12)(x + 5)$
(e) $(x - 11)(x - 5)$ (f) $(x + 10)(x - 9)$
(g) $(x + 6)(x + 2)$ (h) $(x + 12)(x - 6)$
(i) $(x - 5)(x + 2)$

8. (a) $2(7x^2 - 11)(7x^2 + 11)$ (b) $5x^2(x - 5)(x + 3)$
(c) $(2a + 5b)(2a + 5b - 5)$ (d) $(9x - 1 - 4y)(9x - 1 + 4y)$
(e) $(5x - 2)(5x + 2)(25x^2 + 4)$ (f) $(x - y)(x + y)(x^2 + y^2 - 2)$

Chapter 8 Linear Equations in One Variable

Exercise 8.1

1. (a), (c) and (f)

2. (a) LHS = $x - 2y$, RHS = 0 (b) LHS = $4x + 6y$, RHS = 24
(c) LHS = $\frac{5}{3}x + 12$, RHS = $\frac{4}{3}x - 36$ (d) LHS = $3x + 2y$, RHS = 12
(e) LHS = $x - y$ RHS = -7 (f) LHS = $3y$, RHS = $5x - 10$

3. (a) $x = 3$ is not a solution (b) $x = 6$, $y = -5$ is a solution
(c) $x = 8$ is a solution
(d) $x = 5$ is a solution but $x = 2$ is not a solution

4. (a), (d) and (f)

Exercise 8.2

1. (a) $\frac{16}{5}$ (b) 8 (c) 8 (d) 8

2. (a) $\frac{25}{4}$ (b) 1 (c) $\frac{-9}{110}$ (d) 8 (e) $\frac{-3}{4}$ (f) 36

3. (a) 6 (b) $\frac{133}{7}$ (c) 3 (d) -5 (e) -7 (f) $\frac{7}{5}$

4. (a) 11 (b) 7 (c) -1 (d) $\frac{77}{19}$
(e) $\frac{-17}{2}$ (f) $\frac{88}{5}$ (g) 1 (h) 2

Exercise 8.3

1. 39, 46 **2.** 142, 144, 146

3. Geeta's age = 15 yrs, Father's age = 45 yrs

4. $\frac{25}{3}$ **5.** 23, 25, 27 **6.** 55°, 110°, 15°

7. 57 **8.** L = 11 *cm*, B = 3 *cm* **9.** $\frac{3}{7}$

10. 2 *km/hr* **11.** Sonu's age = 15 yr, Sonali's age = 9 yr

12. 65°, 115° **13.** 50°, 60°, 70° **14.** 133 cm^2 **15.** 6 hr

16. Cost of one ball point pen = ₹8, cost of one fountain pen = ₹12

17. Length = 100 *m*, breadth = 50 *m*

18. Number of ₹10 notes = 35, number of ₹20 notes = 18

MCQ - VII

1. $2x - 8 = 10 - 3x$ 2. $\frac{25}{2}$ 3. 18 4. 60

5. 41, 57 6. 108, 114, 120 7. 16, 28 8. 51°

9. 35 years 10. 45 *m*, 15 *m*

Revision Exercise

1. (a) and (c)

2. (a) $y = 6$ is not a solution
(b) $x = 20$ is a solution but $x = 10$ is not
(c) $x = 16$ is a solution but $x = 3$ is not

3. (a) $\frac{67}{2}$ (b) 27 (c) 2 (d) $\frac{51}{7}$
(e) $\frac{-1}{7}$ (f) $\frac{13}{6}$ (g) $\frac{3}{10}$ (h) -1

4. (a) $\frac{18}{7}$ (b) $\frac{41}{10}$ (c) $\frac{-62}{29}$ (d) 6
(e) $\frac{27}{4}$ (f) 40

5. 10 6. A = ₹7500, B = ₹12500, C = ₹15000

7. 62 8. 25, 27 9. 53 10. $\frac{4}{9}$

11. 28°, 84°, 68° 12. 8 years

13. $l = 31\,cm$, b = 17 *cm* 14. 600 *l*

Exercise 9.1

1. (a) 8% (b) $62\frac{1}{2}\%$ (c) $41\frac{2}{3}\%$ (d) $86\frac{2}{3}\%$ (e) $71\frac{3}{7}\%$ (f) $337\frac{1}{2}\%$

2. (a) 80% (b) 0.5% (c) 78 % (d) 15.8 % (e) 140 % (f) 765 %

3. (a) $11\frac{1}{9}\%$ (b) $71\frac{3}{7}\%$ (c) 92% (d) 20 % (e) $212\frac{1}{2}\%$ (f) $301\frac{1}{3}\%$

4. (a) $\frac{6}{25}$ (b) $\frac{37}{200}$ (c) $\frac{5}{8}$ (d) $\frac{1}{2000}$ (e) $\frac{111}{125}$ (f) $\frac{27}{20}$

5. (a) 0.00892 (b) 0.006 (c) 0.125 (d) 0.004 (e) 0.352 (f) 0.0675

Exercise 9.2

1. (a) 7.28 (b) 135 *kg* (c) 10 inches (d) ₹18.75

2. (a) 240% (b) $76\frac{4}{21}\%$ (c) $71\frac{3}{7}\%$ (d) 225%

3. 50000, 32500, 17500

4. 900 **5.** $13\frac{1}{23}\%$ **6.** $14\frac{2}{7}\%$ **7.** $23\frac{1}{3}\%$

8. English **9.** 8% decrease **10.** 20%

Exercise 9.3

1. (a) Profit $11\frac{1}{9}\%$ (b) Profit $16\frac{2}{3}\%$ (c) Loss 12.5% (d) Loss $33\frac{1}{3}\%$

2. (a) SP = ₹784 (b) CP = ₹1500 (c) CP = ₹656 (d) SP = ₹ 637.50

3. Profit $11\frac{1}{9}\%$ **4.** Loss = 20% **5.** 12% **6.** ₹3036

7. ₹10350 **8.** CP = ₹1600, Profit = ₹400 **9.** Loss 1%

10. ₹4500 **11.** CP = ₹800, SP = ₹896

12. SP of first = ₹540, SP of second = ₹690

Exercise 9.4

1. (a) ₹360 (b) ₹875

2. (a) Discount = ₹50, 10% (b) Discount = ₹60, 8%

3. ₹1800

4. Total discount = ₹193.20, Amount returned = ₹673.20

5. ₹7000 **6.** ₹25000 **7.** ₹4533.76 **8.** ₹45

9. 42.625% **10.** 45% **11.** ₹2832 **12.** ₹2316.16

MCQ - VIII

1. 2.75% **2.** 15.625 **3.** 40% **4.** $28\frac{4}{7}\%$

5. $36\frac{4}{11}\%$ **6.** ₹6325 **7.** 70 **8.** $33\frac{1}{3}\%$

9. 25% **10.** ₹724.50

Revision Exercise

1. (a) 200 (b) 564

2. 25% **3.** $56\frac{1}{4}\%$ **4.** 500

5. old price = ₹32, new price = ₹40

6. B

7. Laxmi = ₹10000, Rajeev = ₹12000, Sunil = ₹13200

8. Profit 25% **9.** $2\frac{1}{2}\%$ Profit **10.** Loss 1% **11.** ₹1650

12. 120 **13.** 18 **14.** 66% **15.** ₹14360.50

16. ₹2185

Chapter 10 Interest

Exercise 10.1

1. (a) ₹2160, ₹14160 (b) ₹3000, ₹11000
(c) ₹800, ₹8000 (d) ₹88.20, ₹2188.20

2. 3 years **3.** $\frac{11}{2}\%$ or $5\frac{1}{2}\%$ **4.** ₹120000, ₹16800

5. ₹26000, ₹80000 **6.** ₹18000 **7.** ₹24000, 5.5%

8. ₹4480 **9.** ₹10500, 9% **10.** ₹30000, ₹50000

Exercise 10.2

1. (a) ₹66550, ₹ 16550 (b) ₹134480, ₹6480
(c) ₹56953.125, ₹16953.125 (d) ₹972405, ₹172405

2. ₹47640.64, ₹7640.64

3. ₹172.80 **4.** ₹9364.80 **5.** ₹40000

6. 4% p.a. **7.** 18 years **8.** ₹41580

9. (a) ₹26620, ₹6620 (b) ₹140608, ₹15608 (c) ₹18008.14, ₹2008.14

10. ₹40 **11.** 10% p.a. **12.** ₹30547, ₹4947

13. ₹30000 **14.** ₹15000, 20% p.a. **15.** 2 years

Exercise 10.3

1. $1.22m$ **2.** ₹240975, ₹109025 **3.** 10985000 **4.** 2.07575×10^7

5. 4.2042 tons **6.** 49140

7. (a) 64000 (b) 777924 **8.** 2304

MCQ-IX

1. $P + \frac{P \times R \times T}{100}$ **2.** ₹750 **3.** 0.25%

4. ₹1250 **5.** 8% **6.** 15 years

7. 12% **8.** 828 **9.** 10% **10.** Scheme 1

Revision Exercise

1. (a) ₹2047.50, ₹80047.50 (b) ₹3840, ₹123840
2. ₹2000 **3.** $2\frac{1}{2}$ years **4.** ₹3000 **5.** ₹62500
6. ₹5000 **7.** ₹16000, 5% p.a. **8.** ₹24000
9. 10% p.a. **10.** ₹15300 **11.** 19800 **12.** ₹80000
13. ₹46875 **14.** ₹930 **15.** 4% p.a.

Chapter 11 Direct and Inverse Variations

Exercise 11.1

1. (a), (b), (c), (d)
2. (a) No (b) No (c) Yes
3. (a)

x	18	(54)	108	(96)	144
y	3	9	(18)	16	(24)

(b)

a	(15)	75	120	(1100)	80
b	3	(15)	24	220	(16)

4. (a) 68 (b) 93 **5.** 91 **6.** 24 m **7.** ₹800
8. 262500 **9.** (a) 3.75 m (b) 9 m
10. (a) ₹37500 (b) ₹6300 **11.** (a) 6 days (b) 2640 km
12. (a) 9 days (b) ₹3060

Exercise 11.2

1. (a), (b) and (c)
2. (a)

x	18	(8)	3	(36)
y	4	9	(24)	2

(b)

a	(100)	75	12	(15)	60
b	3	(4)	25	20	(5)

3. (a) Yes (b) No (c) Yes
4. 8 **5.** 56 **6.** 5 kg **7.** 5 days
8. (a) 10 hr (b) 50 km/hr **9.** (a) 160 (b) 6
10. ₹300

Exercise 11.3

1. 24 days **2.** 9 days **3.** 12 days **4.** $7\frac{1}{2}$ days
5. $11\frac{1}{13}$ days **6.** $\frac{8}{15}$ **7.** $7\frac{1}{2}$ hr **8.** 6 days
9. 60 min **10.** 24 days

Exercise 11.4

1. 720 km/hr **2.** (a) 54 km/hr (b) $6\frac{1}{2}$ hr
3. 225 km **4.** $71\frac{1}{9}$ km/hr **5.** 9 s **6.** 24 s
7. 425 m **8.** 48 km/hr **9.** 48 km/hr **10.** 60 km/hr

MCQ-X

1. 28 **2.** 18 **3.** 8 days **4.** 4 **5.** 25
6. $4\frac{1}{2}$ hr **7.** 52 seconds **8.** 30 minutes **9.** 630 m **10.** 60

Revision Exercise

1. (a) Direct (b) Inverse (c) Direct (d) Inverse

2. (a) Inverse

x	45	(15)	36	18	(30)
y	8	24	10	(20)	12

(b) Direct

x	60	(36)	144	84	(288)
y	25	15	60	(35)	120

3. (a) 121 **4.** (a) 30 (b) 8 **5.** 49 **6.** (a) 25 (b) 1080

7. 200 **8.** 80 days **9.** 15 days

10. 16 days, X = 48 days, $Y = 28\frac{4}{5}$ days, Z = 144 days

11. 24 hrs **12.** $11\frac{2}{3}$ days **13.** 22 seconds

14. $68\frac{4}{7}$ *km/hr* **15.** 9 *hrs*

Chapter 12 Visualising Shapes

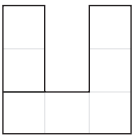
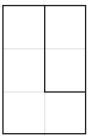
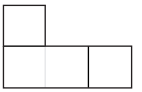
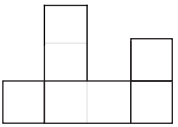
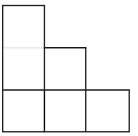
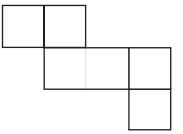
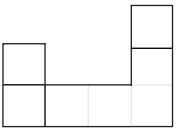
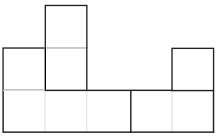
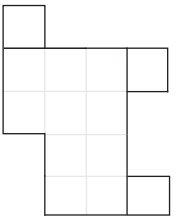
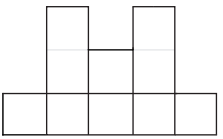
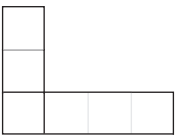
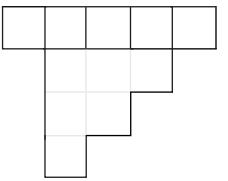
EXERCISE 12.1

1.

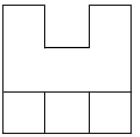
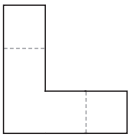
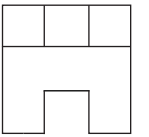
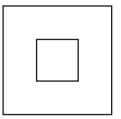
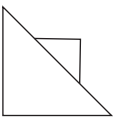
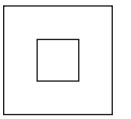
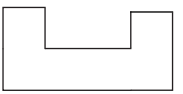
2D	3D	3D	2D	3D	2D	3D

2. (a) Cylinder, Cone, Hemisphere (b) Prism, Cuboid
(c) Sphere, Cylinder (d) Cube, Pyramid, Cuboid, Cylinder

4.

	Front	Side	Top
(a)			
(b)			
(c)			
(d)			

5.

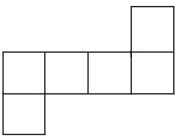
	Front	Side	Top
(a)			
(b)			
(c)			

EXERCISE 12.2

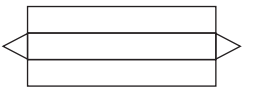
1.

F	E	V
5	⑨	6
⑥	10	6
8	18	⑫
⑦	⑫	⑦
⑥	⑫	⑧

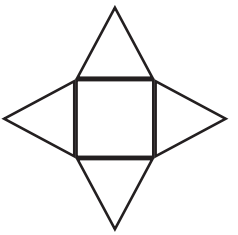
2. (a) Cube



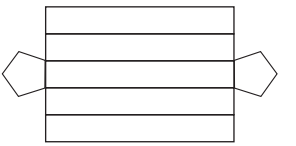
(b) Triangular Prism



(c) Square Pyramid



(d) Pentagonal Prism



Chapter 13 Understanding Quadrilaterals

Exercise 13.1

1. (a) Heptagon (b) Quadrilateral (c) Nonagon (d) Triangle
2. (a) 540 (b) 9 (c) Polygon (d) Regular
3. (a) False (b) False (c) True (d) True
4. (a) Concave (b) Convex (c) Concave (d) Concave
5. (a) Sides - AB, BC, CA
Diagonals - None

(b) Sides - AB, BC, CD, DE, EF, FA
Diagonals - AC, AD, AE, BD, BE, BF, CE, CF, DF
(c) Sides - JK, KL, LM, MN, NO, OP, PQ, QJ
Diagonals - JL JM, JN, JO, JP, KM, KO, LP, MO, MP, MQ, NP, NQ, OQ
(d) Sides - WX, XY, YZ, ZW
Diagonals - WX, XZ

6. (a) 1080° (b) 1800° (c) 540° (d) 1440°
7. 5 **8.** 15
9. (a) 115 (b) 80 (c) 30 (d) 110

Exercise 13.2

1. (a) PQ, RS and QR, SP (b) SP, PQ and QR, RS
(c) PR, QS (d) ∠PQR, ∠QRS and ∠RSP, ∠SPQ
2. 140° **3.** 90° **4.** 60°, 84°, 84°, 132°
5. They are also supplementary.
6. 100°, 100°, 100°, 60°
7. ∠P = 55°, ∠Q = 110°, ∠R = 165°, ∠S = 30°
8. (a) 110 (b) 65 (c) 12

Exercise 13.3

1. MNQP, MNFE, MNCB, PQFE, PQCB, EFCB
2. ∠A = 62°, ∠B = 118°, ∠C = 62°, ∠D = 118°
3. 75°, 105°, 75°, 105° **4.** 30
5. (a) JM = ML and JK = KL (b) ∠MJK = ∠MLK
(c) MK (d) Right Angle (90°)
6. ∠CDB = 55°, ∠ADB = 55°
7. $x = 15$, $y = 20$
8. $\angle W = 40°$, $\angle X = 140°$, $\angle Y = 40°$, $\angle Z = 140°$
9. 11 *cm*
10. JK =15 *cm* , KL= 30 *cm* , LM =15 *cm* , MJ =30 *cm*

Exercise 13.4

1. (a) Rectangle / Square (b) Rectangle / Square
(c) Rhombus / Square (d) Perpendicular, bisect
2. (a) Rectangle / Square (b) Parallelogram
(c) Isosceles Trapezium (d) Rhombus / Square
3. 61° 4. 28 *cm* 5. 25 *cm*
6. 45°, 135°, 45°, 135° **7.** $x = 3$, Perimeter = 36 *cm*

MCQ - XI

1. kite **2.** bisect each other **3.** Rectangle **4.** 50
5. Rectangle **6.** 115°, 65°, 115° **7.** 81 cm^2 **8.** 48°, 132°
9. Rhombus **10.** 135°

Revision Exercise

1. (a) True (b) False (c) True
2. (a) Perpendicular (b) Rectangle / Square (c) 90°
3. (a) 252° (b) 324°
4. (a) 14 **5.** 12 **6.** 70°, 110°, 75°, 105°
7. (a) 50 (b) 40 (c) 65
8. Rectangle or square
9. 76°, 104°, 76°, 104° **10.** 36°, 144°, 36°, 144°
11. $x = 30$, $y = 3$
12. Sides are 18 *cm*, 24 *cm*, diagonal is 30 *cm*
13. 17 *cm*
14. (a) 50 (b) 50 (c) 28
15. $\angle ABO = 45°$, $\angle ODC = 45°$, $\angle ACB = 45°$, $\angle CBD = 60°$

Chapter 15 Mensuration

Exercise 15.1

1. 666 cm^2 2. 180 *m*, 120 *m* 3. 3025 cm^2 4. 64 *m*
5. ₹108 6. 21 cm^2 7. 56 *cm*
8. Perimeter = 112 *cm*, Area = 336 cm^2
9. ₹4521.60 10. 210 *m*, ₹54250

Exercise 15.2

1. 264 cm^2 **2.** 20 *cm*, 480 cm^2 **3.** 20 *cm*, 28 *cm* **4.** 28 m^2
5. 20 *cm* **6.** 11 *cm*, 22 *cm* **7.** 180 cm^2 **8.** 300 cm^2
9. (a) 220 cm^2 (b) 56 cm^2
10. (a) 3100 m^2 (b) 2450 m^2

Exercise 15.3

1. (a) LSA = 220 cm^2, TSA =460 cm^2
(b) LSA = 487.5 cm^2, TSA = 987.5 cm^2
2. L = 15 *cm*, B= 9 *cm*, H = 3 *cm*
3. 11 *cm* 4. 544 cm^2 5. Area = 88 m^2 , cost = ₹440
6. LSA = 51.84 cm^2, TSA = 77.76 cm^2
7. 1000 cm^2
8. (a) CSA = 1320 cm^2, TSA = 4092 cm^2
(b) CSA = 2310 cm^2, TSA = 10010 cm^2
9. LSA = 990 cm^2, TSA = 1336.5 cm^2
10. 5 : 6

Exercise 15.4

1. 64 **2.** 8 *cm* **3.** ₹2880 **4.** 30 *m*
5. 112.5 *kg* **6.** 2310 cm^3 **7.** 34650 cm^3 **8.** 31839.60 g
9. Ratio of CSA = 5 : 6, Ratio of volume = 5 : 9
10. 2772 cm^2

MCQ - XII

1. 504 cm^2 **2.** 5000 **3.** $\pi r^2 + 2\pi rh$ **4.** 3 cm **5.** 50
6. 484 cm^2 **7.** 96 cm^2 **8.** 9 cm **9.** 48510 **10.** 32 cm

Revision Exercise

1. 173 cm^2 (approx) **2.** 1386 cm^2 **3.** 19.3 cm^2
4. Area of Path = 1350 m^2, Cost = ₹93750 5. ₹450
6. Cost of levelling = ₹1694, Cost of fencing = ₹2640
7. 750 m^2 8. 742 cm^2 9. 6425 m^2
10. 264 cm^2 11. 401.92 cm^2 12. length = 15 m, area = 117 m^2
13. length = 15 m, area = 1350 cm^2 **14.** 72 **15.** 49500 l

Chapter 16 Data Handling & Representation

Exercise 16.1

1. (a) Frequency (b) Inclusive (c) 7 (d) Range

2.

Heights *(in cm)*	Tally Marks	Frequency
139	||	2
140	𝍸 |	5
142	|	1
146	||	2
148	||||	4
149	||	2
150	||||	4
151	||	2
152	||	2
153	||	2
154	|	1
158	|	1
160	||	2
Total		**30**

3.

Class Interval	Tally Marks	Frequency
100 - 110	|||	3
110 - 120	|||	3
120 - 130	||	2
130 - 140	|||	3
140 - 150	𝍸	5
150 - 160	𝍸	5
160 - 170	|||	3
170 - 180	||	2
180 - 190	||	2
190 - 200	|	1
200 - 210	|||	3
Total		**32**

4. (a) 99 (b) 30 (c) 14

5. (a)

Class Interval	Tally Marks	Frequency
151 - 155	𝍸 ||	7
156 - 160	𝍸 ||||	9
161 - 165	𝍸 |||	8
166 - 170	𝍸 |	6
Total		**30**

(b) Maximum plants attain a height of 156-160 cm

6.

Class Interval	Tally Marks	Frequency
60 - 80	𝍸	5
80 - 100	𝍸 𝍸 |||	13
100 - 120	𝍸 𝍸 𝍸 ||	17
120 - 140	𝍸 𝍸	10
140 - 160	|	1
160 - 180		0
180 - 200	|||	3
200 - 220	|	1
Total		**50**

7.

Monthly Expend. *(in* ₹*)*	Number of Families	Cummulative frequency
5000 - 10000	12	12
10000 - 15000	19	31
15000 - 20000	24	55
20000 - 25000	32	87
25000 - 30000	35	122
30000 - 35000	16	138
35000 - 50000	8	146
Total	**146**	

(a) 122

(b) ₹25000 – ₹30000

(c) 91

8.

Class Interval	Tally Marks	Frequency	Cummulative frequency
20 - 30	|	1	1
30 - 40	|||	3	4
40 - 50	𝍸	5	9
50 - 60	𝍸 |||	8	17
60 - 70	𝍸 |||	8	25
70 - 80	𝍸 ||||	9	34
80 - 90	||||	4	38
90 - 100	||	2	40
Total		**40**	

9.

Class Interval	Frequency	Cummulative frequency
25 - 30	4	4
30 - 35	(9)	13
35 - 40	16	(29)
40 - 45	10	(39)
45 - 50	(3)	42

Exercise 16.2

1. (a) 51.83 *(approx)* (b) 142.8

2. 761 **3.** 152 *cm* **4.** 12.9 **5.** 13

6. (a) 9 (b) 70.16 *kg (approx)* (c) 55 **7.** 3

8. (a) 25.40 *(approx)* (b) 25.85 *(approx)*

9. 24 **10.** 1

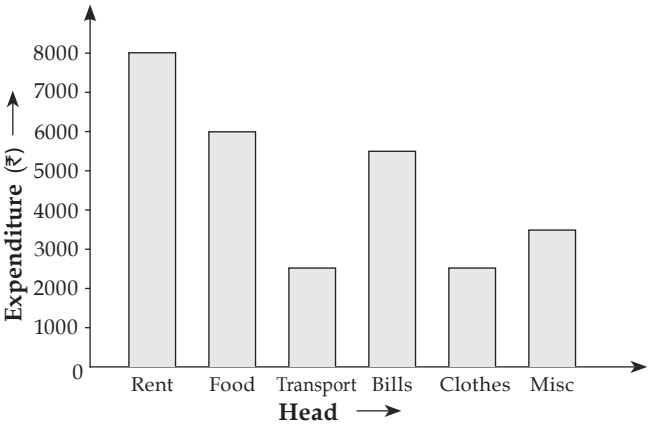
Exercise 16.3

= 30 bottles

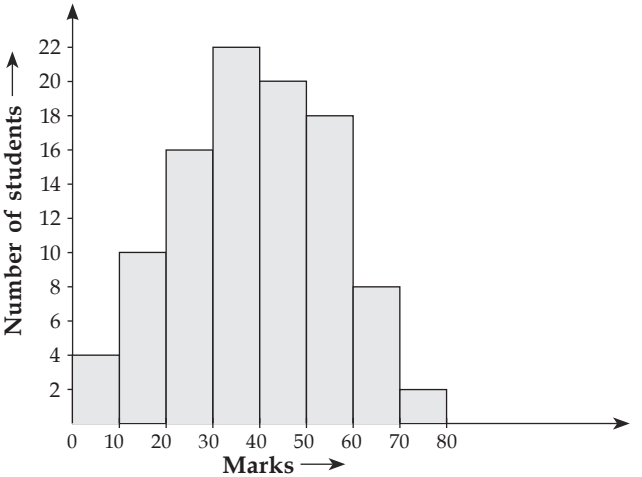
1.

Hotel Name	A	B	C	D
Number of bottles	4	2	1½	2½

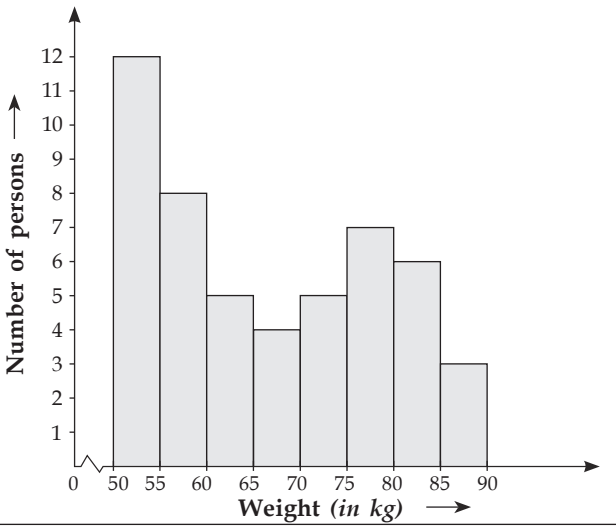
2.


Expenditure (₹)
8000
7000
6000
5000
4000
3000
2000
1000
0
Rent
Food
Transport
Bills
Clothes
Misc
Head

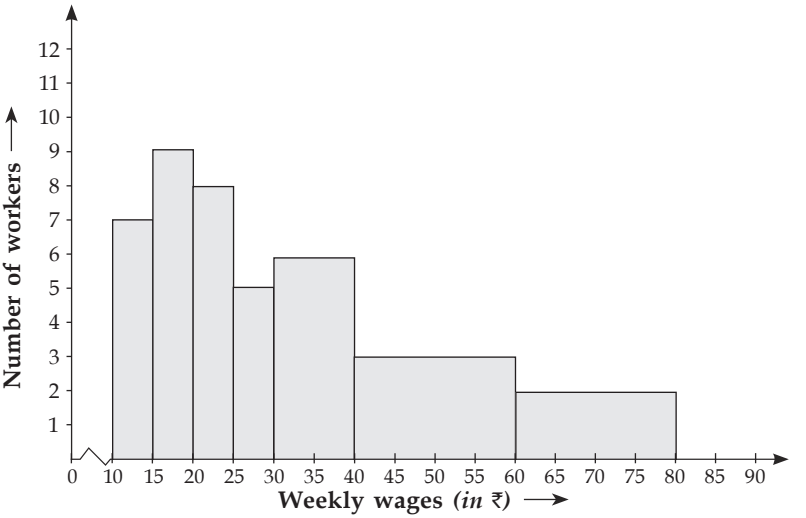
3.


Number of students
22
20
18
16
14
12
10
8
6
4
2
0
10
20
30
40
50
60
70
80
Marks

4.

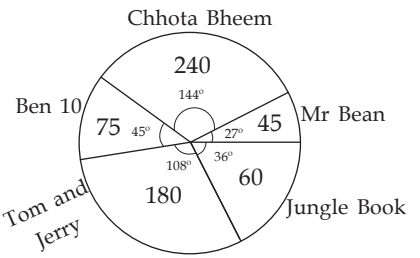

Number of persons
12
11
10
9
8
7
6
5
4
3
2
1
0
50
55
60
65
70
75
80
85
90
Weight (in kg)

5.



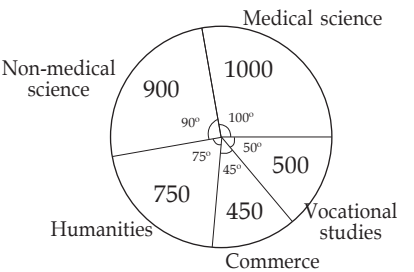
6.

Cartoon show	Sector angle
Chhota Bheem	144°
Ben 10	45°
Tom and Jerry	108°
Jungle Book	36°
Mr Bean	27°



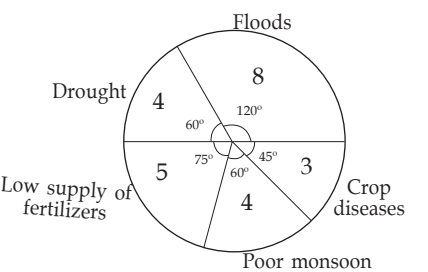
7.

Stream	Sector angle
Medical Science	100°
Non-medical Science	90°
Humanities	75°
Commerce	45°
Vocational Studies	50°



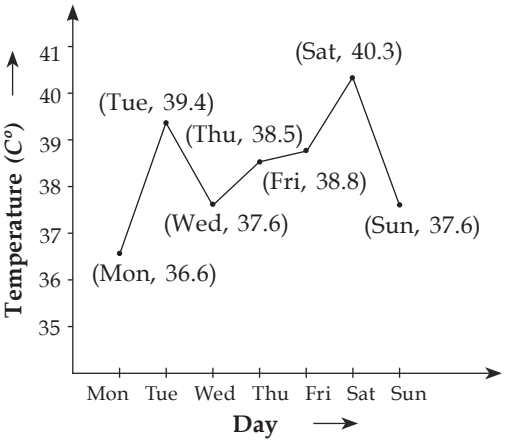
8.

Cause	Sector angle
Floods	120°
Drought	60°
Low supply of fertilizers	75°
Poor monsoon	60°
Crop diseases	45°

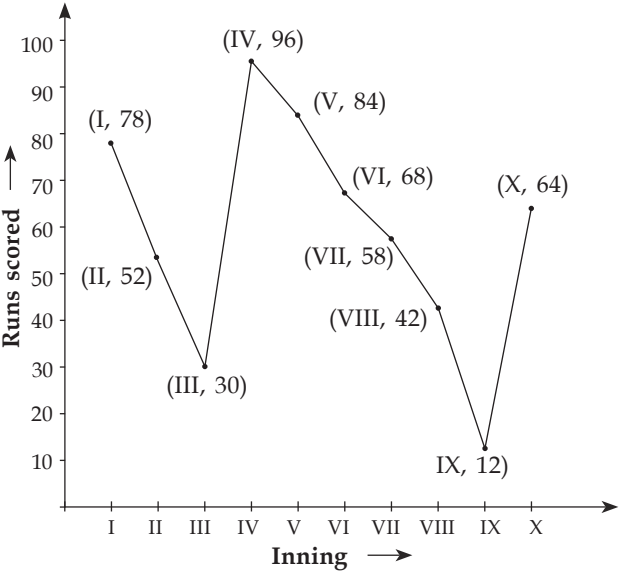


9. (a) Hindi (b) 30 (c) Yes

10.



11.



Exercise 16.4

1. (a) 0, 1 (b) 1 (c) $\frac{1}{2}$ (d) equal

2. (a) $\frac{2}{9}$ (b) $\frac{1}{3}$ (c) $\frac{4}{9}$ (d) $\frac{2}{3}$

3. $\frac{2}{5}$

4. (a) $\frac{3}{7}$ (b) $\frac{4}{7}$ **5.** $\frac{5}{7}$ **6.** $\frac{5}{6}$ **7.** $\frac{10}{11}$

8. (a) $\frac{4}{9}$ (b) $\frac{2}{3}$ (c) $\frac{7}{9}$ **9.** $\frac{1}{40}$ **10.** $\frac{4}{5}$

MCQ - XIII

1. 10 **2.** –2.1 **3.** 42.75 **4.** 1:6 **5.** 19

6. $\frac{1}{6}$ **7.** 5000 **8.** 0.37 **9.** Histogram **10.** $\frac{3}{5}$

Revision Exercise

1.

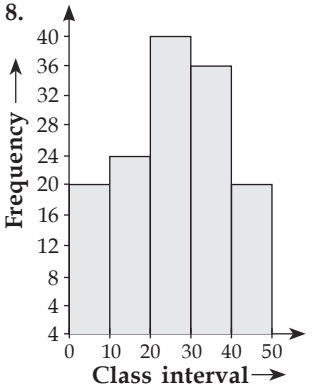
Blood group	Tally Marks	Frequency
A	𝍸 𝍸 | | |	13
B	𝍸 𝍸 | |	12
AB	𝍸 | |	7
O	𝍸 | | |	8
Total		40

2.

Class Interval	Tally Marks	Frequency
0 - 10	| | | |	4
10 - 20	𝍸 | | | |	9
20 - 30	𝍸 | | |	8
30 - 40	𝍸	5
40 - 50	| | | |	4
Total		30

3. 11.2 **4.** 17.275 **5.** 6 **6.** 1187 **7.** 12

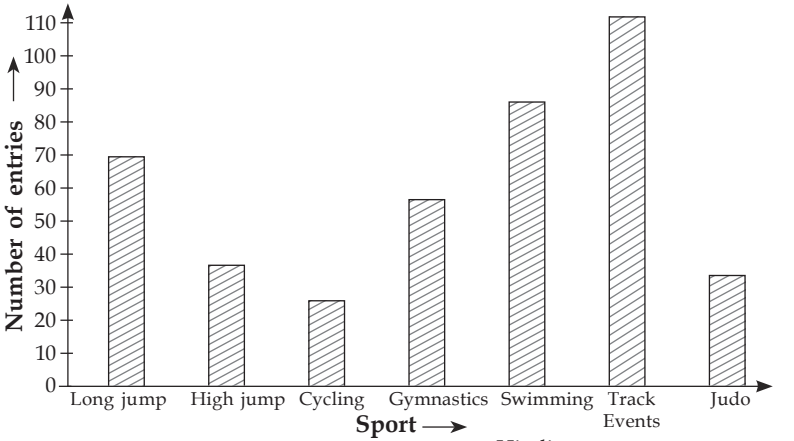
8.



9. ☺ = 30 teachers

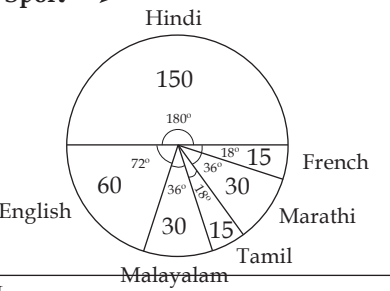
Zone	*Number of teachers*
East	☺☺☺☺☺☺☺☺
West	☺☺☺☺☺☺
South	☺☺☺☺☺◔
North	☺☺☺☺
Central	☺☺☺☺◔

10.



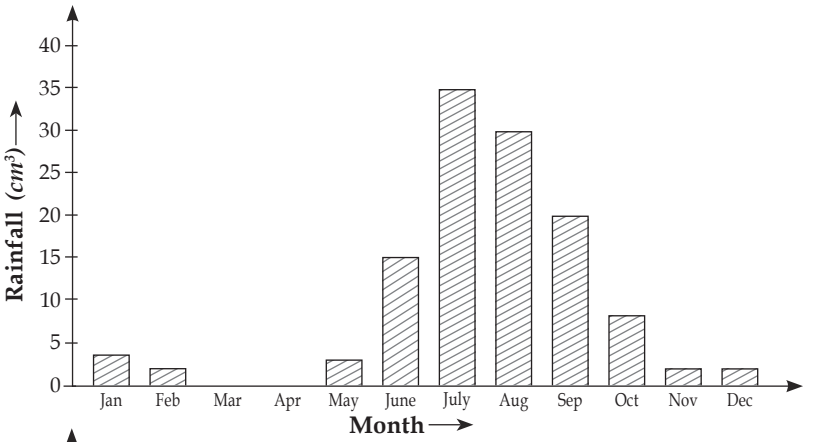
11.

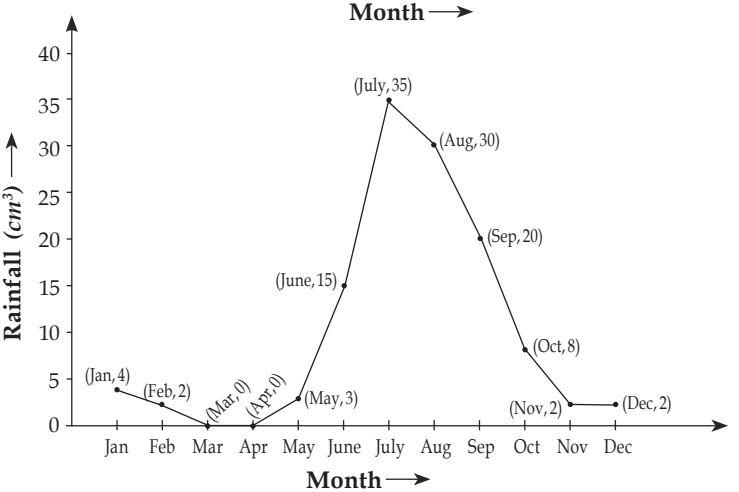
Language	Sector angle
Hindi	180°
English	72°
Malayalam	36°
Tamil	18°
Marathi	36°
French	18°



12. (a) ₹45000 (b) ₹3000 (c) ₹8000 (d) ₹10000

13.





14. (a) $\frac{1}{5}$ (b) $\frac{4}{25}$ (c) $\frac{3}{10}$ (d) $\frac{19}{25}$

15. (a) $\frac{4}{15}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $\frac{11}{15}$

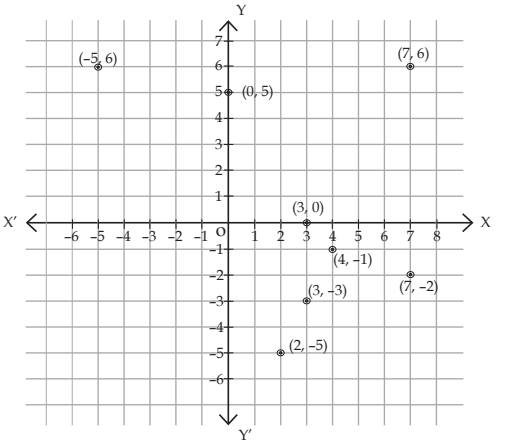
16. (a) $\frac{29}{50}$ (b) $\frac{59}{100}$ (c) 0 (d) $\frac{19}{50}$

Chapter 17 Cartesian System and Coordinates

Exercise 17.1

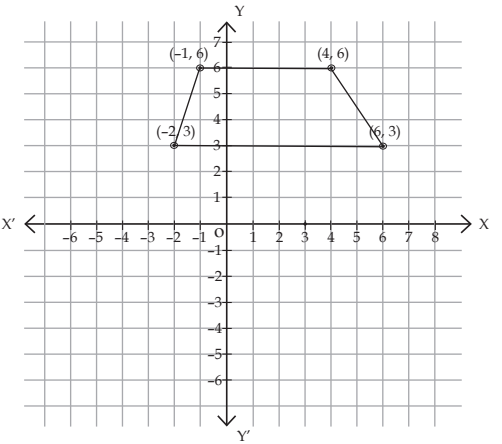
1. (a) 4 (b) – , – (c) –4 (d) –6

2.



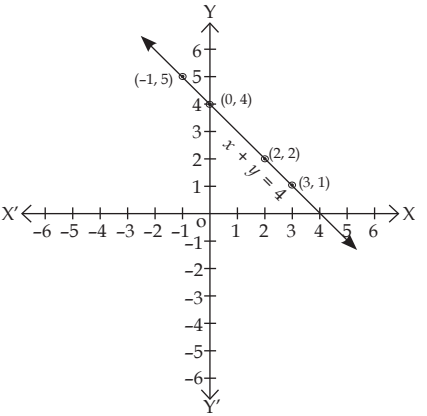
3. A (4, 2)
B (–1, 4)
C (–2, –3)
D (3, –2)
E (3, 5)
F (–4, 0)
G (0, –2)
H (2, –4)

4. Trapezium



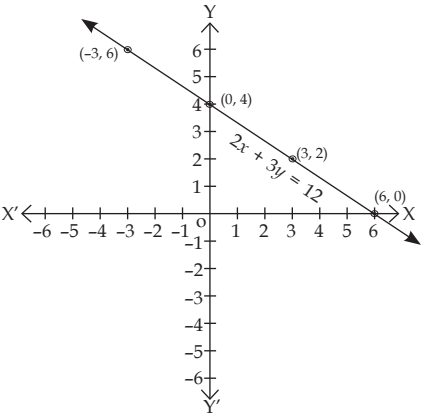
5. (a)

x	0	–1	2	3
y	4	5	2	1



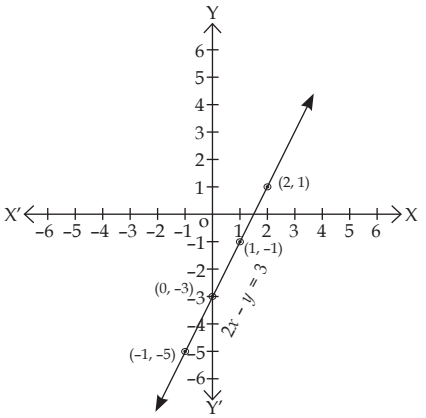
(b)

x	0	3	6	–3
y	4	2	0	6



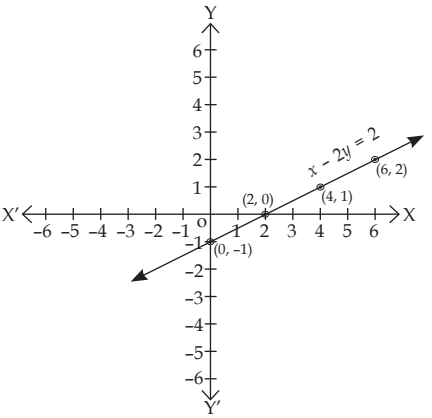
(c)

x	0	1	–1	2
y	–3	–1	–5	1



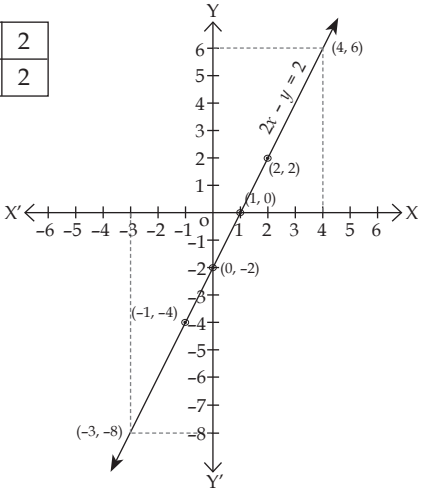
(d)

x	0	2	4	6
y	–1	0	1	2



6.

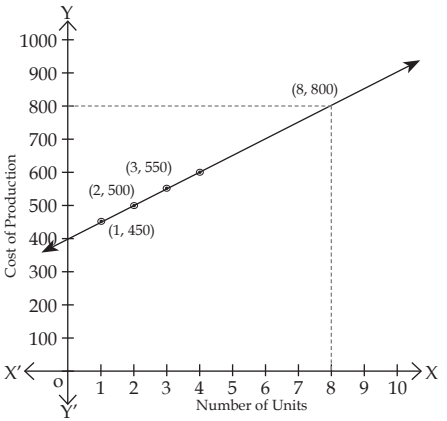
x	0	1	–1	2
y	–2	0	–4	2



Exercise 17.2

1.

x	1	2	3	4
y	450	500	550	600



2. (a) 55 *km/hr*
(b) 60 *Km*
(c) 90 *Km*

Revision Exercise

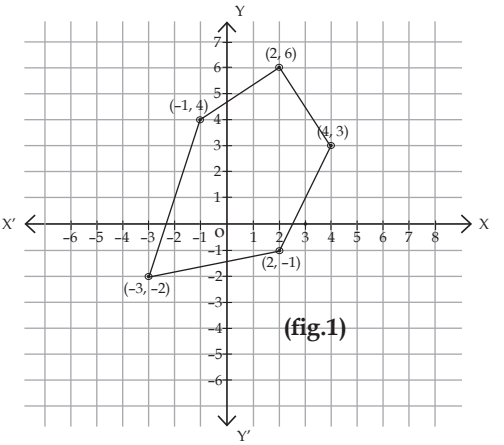
1. (a) 3, –5

(b) line

(c) III

(d) Y–axis

2. Pentagon



(fig.1)

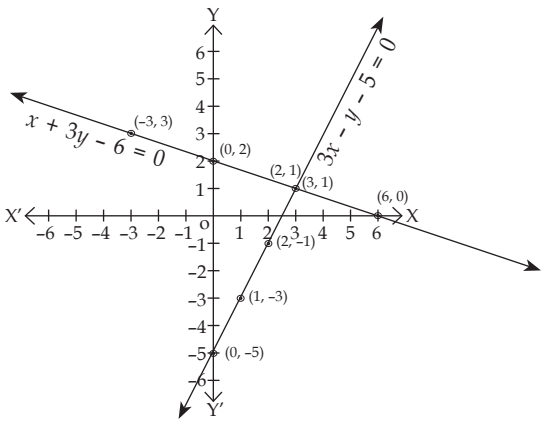
3. (3, 1)

$x + 3y - 6 = 0$

x	0	3	6	–3
y	2	1	0	3

$2x - y - 5 = 0$

x	0	1	2	3
y	–5	–3	–1	1



4. A (–3, 3), B (4, –5), C (–1, –3), D (3, 3)
E (0, 2), F (5, 0), G (2, –2) H (–5, –4)

SAMPLE PAPER

SA I

Section A

1. (b) **2.** (a) **3.** (d) **4.** (c)

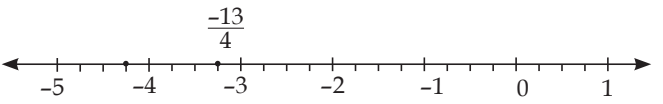
5. (a) **6.** (a) **7.** (d) **8.** (c)

9. (d) **10.** (b)

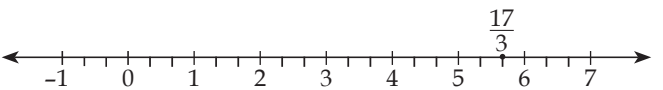
Section B

11. $(5x + 12y)\ (3x^2 - 2y)$

12. (a)



(b)



13. We can't cancel 3 in numerator with 6 in denominator

$$\frac{3(x^2 - 4) + 7}{6} = \frac{3x^2 - 12 + 7}{6} = \frac{3x^2 - 5}{6}$$

14. Mass of proton *approx.* 1836 times more than that of electron.

15. $8\frac{1}{8}\,cm$

Section C

16. 6, 252

17. (a) 1295029 (b) 6351

18. $\frac{35}{8}, \frac{19}{4}, \frac{41}{8}$

19. (a) 5 or 0 (b) 4 (c) 4

(d) 0 (e) 2 or 6

20. $(2x + 3y - 5)\quad (2x + 3y + 5)$

21. 12, 42

22. $\frac{80}{27}$, multiplicative inverse = $\frac{27}{80}$

23. $-3x^5 + x^4 + 32x^3 - 83x^2 - 33x + 67$

24. 99980001, 9999

25. $\frac{-6}{11}$ **26.** $x + 2$ **27.** $\frac{5}{8}$

Section D

28. 25

29. Quotient = $x^2 - 2x + 6$, remainder = $3x - 15$

30. (a) $(x - 19)(x + 4)$ (b) $2(x - 4)(x + 4)(x^2 + 16)$

31. (a) $\frac{-288}{25}$

32. (b) $\frac{-24}{5}$ (b) 21.6

33. (a) 180 (b) $108x^2y + 16y^3$

SAMPLE PAPER
SA II

Section A

1. (b) **2.** (a) **3.** (b) 4. (d)
5. (b) **6.** (d) 7. (d) **8.** (b)
9. (b) 10. (c)

Section B

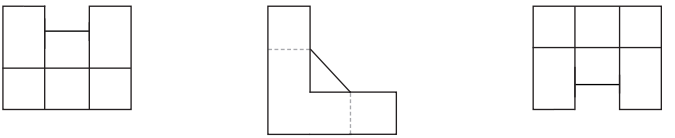
11. 60°, 140°, 40° and 120° 12. 20%
14. 54 *km/hr* 15. 144 *cm*

Section C

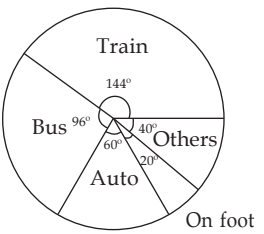
16. 4480 **17.** Loss 4%

18.

Font **Side** **Top**



19.



20. ₹25000 **21.** 58% **22.** $y = -3$ **23.** 13 Days

25. Area = 384 cm^2, perimeter = 80 cm

26. 42.6 years **27.** 600 cm^2

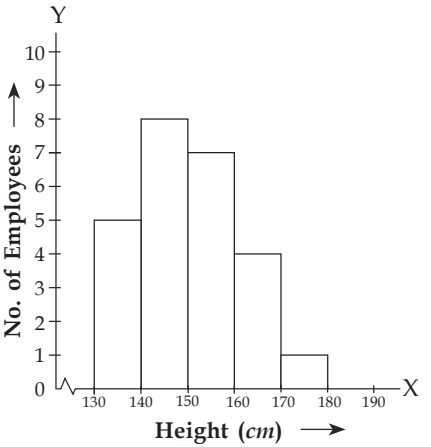
Section D

28. 4150 m^2 **29.** ₹7500

30. (a) 40° (b) 40° (c) 40° (d) 65°

31.

Height *(cm)*	Tally Marks	Frequency
130 - 140	𝍸	5
140 - 150	𝍸 |||	8
150 - 160	𝍸 ||	7
160 - 170	||||	4
170 - 180	|	1
Total		25



32. ₹90970.25, ₹1270.25

33. (a) 6336 cm^3 (b) 6336 cm^2

Mental Ability Test

1. 4 **2.** 31 **3.** 2

4. 31 **5.** 2 **6.** 16

7. 23, 30, 32 **8.** 12, 13, 14 **9.** 15, 24, 31

10. 62 **11.** HDIYRZGG

12. Mother **13.** Daughter **14.** Brother-in-law

15. Three **16.** East **17.** D is third to the left of E

18. 46650 **19.** 18 **20.** 2