MATH - 08

EXERCISE 1.1

1. $\frac{55}{-99}=\frac{(-55)\div 11}{99\div 11}=\frac{-5}{9}$

2, 4, 5 and 14 : Take help of the Answer Sheet.

3. $\frac{-48}{60}=\frac{-48\div 12}{60\div 12}=\frac{-4}{5}$

6. (a) $\frac{3}{7}+\left(\frac{-6}{11}\right)+\left(\frac{-8}{21}\right)+\frac{5}{22}$

$=\frac{3}{7}+\left(\frac{-8}{21}\right)+\left(\frac{-6}{11}\right)+\frac{5}{22}$ (Commutativity of addition)

$=\frac{9+(-8)}{21}+\frac{-12+5}{22}$

$=\frac{1}{21}+\frac{-7}{22}$

$=\frac{22+(-7)\times 21}{462}=\frac{22-147}{462}=\frac{-125}{462}$

(b) $\left(\frac{-4}{5}\right)\times\frac{3}{7}\times\frac{15}{16}\times\left(\frac{-14}{9}\right)$

$=\frac{-4}{5}\times\frac{15}{16}\times\frac{3}{7}\times\frac{-14}{9}$ (Commutativity of multiplication)

$=\frac{-1}{1}\times\frac{3}{4}\times\frac{1}{1}\times\frac{-2}{3}$

$=\frac{1}{2}$

7. Additive inverse is the negative of the given number

(a) Additive inverse of $\frac{3}{7}=-\frac{3}{7}$

(b) Additive inverse of $\frac{-4}{11}=-\left(\frac{-4}{11}\right)=\frac{4}{11}$

(c) Additive inverse of $\frac{-3}{-5}=-\left(\frac{-3}{-5}\right)=\frac{3}{-5}=\frac{-3}{5}$

(d) Additive inverse of $\frac{8}{-27}=-\left(\frac{8}{-27}\right)=\frac{8}{27}$

(e) Additive inverse of $\frac{17}{-10} = -\left(\frac{17}{-10}\right) = \frac{17}{10}$

8. Solve according to Example 6.

9. (a) $\left(\frac{-5}{8} + \frac{9}{8}\right) + \frac{13}{8} = \frac{-5}{8} + \left(\frac{9}{8} + \frac{13}{8}\right)$

$\Rightarrow \quad \frac{-5+9}{8} = \frac{4}{8} + \frac{13}{8} = \frac{-5}{8} + \left(\frac{9+13}{8}\right) = \frac{22}{8}$

$\Rightarrow \quad \frac{4}{8} + \frac{13}{8} = \frac{-5}{8} + \frac{22}{8}$

$\Rightarrow \quad \frac{4+13}{8} = \frac{17}{8} \Rightarrow \frac{-5+22}{8} = \frac{17}{8}$

$\Rightarrow \quad \frac{17}{8} = \frac{17}{8}$ Verified

(b Solve accordingly above.

10. (a) Multiplicative inverse of $-17 = \frac{1}{-17} = \frac{-1}{17}$

(b) Multiplicative inverse of $-1 = \frac{1}{-1} = \frac{-1}{1} = -1$

(c) Multiplicative inverse of $\frac{1}{3} = \frac{3}{1} = 3$

(d) (e) : Solve according to (c).

11, 12. : Take help of the Answer Sheet

13. Solve according to Example 7.

14. Take help of the Answer Sheet.

EXERCISE 1.2

1. and 2 : Solve according to number lines shown on page 12 of the text book.

3. A rational number between two rational numbers is their mean.

(a) Mean of $\frac{-1}{2}$ and $\frac{1}{2} = \left(\frac{-1}{2} + \frac{1}{2}\right) \div 2 = 0 \div 2 = 0$

(b) Mean of $\frac{1}{5}$ and $\frac{1}{2} = \left(\frac{1}{5} + \frac{1}{2}\right) \div 2 = \frac{2+5}{10} \div 2 = \frac{7}{10} \times \frac{1}{2} = \frac{7}{20}$

(c), (d) : Solve according to (a) and (b).

4 and 5 : Solve according to Example 9.

6, 7 and 8, : Solve according to Example 8, 10.

M.C.Q.

1. $\left(\frac{-5}{16}+\frac{7}{12}\right)$

$=\frac{-5+28}{48}=\frac{13}{48}$

2, 3, 4, 5 and 7 : Take help of the Answer Sheet.

6. $\frac{\overset{3}{\cancel{-9}}}{\underset{2}{\cancel{16}}}\times\frac{\cancel{8}}{\underset{5}{\cancel{15}}}=\frac{-3}{10}$

8. Solve according to Example 9.

EXERCISE 2.1

1. (a) $x+4=7 \quad\Rightarrow\quad x=7-4 \quad\Rightarrow\quad x=3$

(b) $y-3=12 \quad\Rightarrow\quad y=12+3 \quad\Rightarrow\quad y=15$

(c) $8=p+3 \quad\Rightarrow\quad -p=3-8 \quad\Rightarrow\quad -p=-5 \quad\Rightarrow\quad p=5$

(d), (e), (h) and (*l*) : Solve according to Example 4.

(f), (g), (j) and (k) : Solve according to Example 3.

(i) Solve according to Example 1.

(m) $\frac{x}{0.3}=0.3$

$x=0.3\times 0.3=0.09$

(n) $\frac{16}{5x}=\frac{1}{10}$

By cross multiplication

$16\times 10=5x\times 1$

$160=5x$

$\Rightarrow \quad x=\frac{160}{5}=32$

(o) $\frac{36}{x+2}=12$

$\Rightarrow \quad 36=12\,(x+2)$

$36=12x+24$

$12x=36-24$

$12x=12$

$x=\frac{12}{12}=1$

EXERCISE 2.2

1. Let the numbers are x and $(x + 10)$.

Sum $= x + (x + 10) = 74 \quad \Rightarrow \quad x + x + 10 = 74$

$\Rightarrow 2x + 10 = 74 \quad \Rightarrow 2x = 74 - 10 = 64 \quad \Rightarrow x = 64 \div 2 = 32$

Numbers are 32 and $32 + 10 = 42$

2. Let the numbers be $2x$ and $5x$.

Difference $= 5x - 2x = 66 \quad \Rightarrow \quad 3x = 66 \quad \Rightarrow \quad x = 66 \div 3 = 22$

Numbers are $2 \times 22 = 44$ and $5 \times 22 = 110$

3. Let the consecutive integers be $x, (x + 1)$ and $(x + 2)$

Sum $= x + x + 1 + x + 2 = 3x + 3 = 51$

$\Rightarrow 3x = 51 - 3 = 48 \quad \Rightarrow \quad x = 48 \div 3 = 16$

Numbers are $16, 16 + 1 = 17, 16 + 2 = 18$

4. Let x be added.

$$2 \times \frac{(-7)}{3} + x = \frac{3}{7}$$

$$\Rightarrow \quad \frac{-14}{3} + x = \frac{3}{7}$$

$$\Rightarrow \quad x = \frac{3}{7} + \frac{14}{3} = \frac{9 + 98}{21} = \frac{107}{21}$$

5. Let the three consecutive mutiple of 11 be, $11x$, 11 $(x + 1)$, 11 $(x + 2)$ and their sum = 363.

$\therefore \quad 11x + 11\,(x + 1) + 11\,(x + 2) = 363$

$\Rightarrow 11\,[x + (x + 1) + (x + 2)] = 363$

$\Rightarrow 11\,(3x + 3) = 363$

$\Rightarrow 3x + 3 = \frac{363}{11}$ (Dividing both sides by 11)

$\Rightarrow 3\,(x + 1) = 33$

$\Rightarrow x + 1 = \frac{33}{3}$ (Dividing both sides by 3)

$x + 1 = 11$

$\Rightarrow x = 11 - 1 = 10$

The three numbers are : $11x = 11 \times 10 = 110$

$11\,(10 + 1) = 11 \times 11 = 121$

$11\,(10 + 2) = 11 \times 12 = 132$

Hence, the required numbers are 110, 121 and 132.

6. Solve according to Example 10.

7. Let the consecutive integers are x, $(x+1)$ and $(x+2)$.

$$x \times 2 + (x+1) \times 3 + (x+2) \times 4 = 74$$

$\Rightarrow \; 2x + 3x + 3 + 4x + 8 = 74$

$\Rightarrow \; 9x + 11 = 74$

$\Rightarrow \; 9x = 74 - 11 = 63$

$\Rightarrow \; x = 63 \div 9 = 7$

Integers are $7,\ 7+1=8$ and $7+2=9$

8. Let David's present age $= x$ years

After 15 years David's age $= x + 15$

$\Rightarrow \; x + 15 = 4x \qquad \Rightarrow \qquad x - 4x = -15$

$\Rightarrow \; -3x = -15 \qquad \Rightarrow \qquad x = -15 \div (-3) = 5$

David's present age $= 5$ years

9. Let Rani's present age $= x$ years

Her father's age $= (x + 29)$ years

Her grandfather's age $= x + 29 + 26 = x + 55$

$$x + x + 29 + x + 55 = 135$$

$$3x + 84 = 135$$

$\Rightarrow \; 3x = 135 - 84 = 51 \qquad \Rightarrow \; x = 51 \div 3 = 17$

Rani's age = 17 years, Father's age = 17 + 29 = 46 years

Grandfather's age $= 46 + 26 = 72$ years

10. Solve according to Example 11.

EXERCISE 2.3

1. **(a) to (f) :** Solve according to Example 12.

(g) to (j) : Solve according to Example 13.

(k) $\dfrac{m-17}{2} = 2m - 7$

$m - 17 = 2\,(2m - 7)$

$m - 17 = 4m - 14$

$m - 4m = -14 + 17$

$-3m = 3$

$m = \dfrac{-3}{3} = -1$

(*l*) $\frac{x}{3}-7=\frac{2x}{3}+2$

$\frac{x}{3}-\frac{7}{1}=\frac{2x}{3}+\frac{2}{1}$

$\frac{x-21}{3}=\frac{2x+6}{3}$ *(By cross multiplication)*

$3(x-21)=3(2x+6)$

$3x-63=6x+18$

$3x-6x=18+63$

$-3x=81$

$x=\frac{-81}{3}=-27$

(m) to (p) : Solve according to (k) and (l) above.

EXERCISE 2.4

1, 2, : Solve according to Example 14.

3. Let she thought the number to be x.

$(x-5)\times 8=3x$

$\Rightarrow \quad 8x-40=3x$

$\Rightarrow \quad -40=3x-8x$

$\Rightarrow \quad +40=+5x$

$x=\frac{\cancel{40}}{\cancel{5}}=8$

4. Solve according to Example 15.

5. Let Harry's present age be x and mothers age $= 6x$ years

$(x+5)=\frac{1}{3}(6x+5)$. Solve the equation.

6. Let the granddaughter's age $= x$ years

Grandfathers' age $= 10x$ years

$10x-x=54 \quad \Rightarrow \quad 9x=54 \quad \Rightarrow \quad x=54\div 9=6$

Granddaughter's age $= 6$ years, Grandfather's age $= 60$ years

7. Let there were x deer in the herd.

Number of grazing deer $=\frac{x}{2}$;

Remaining $=x-\frac{x}{2}=\frac{x}{2}$

Number of deer playing by $= \frac{3}{4} \times \frac{x}{2} = \frac{3x}{8}$

Remaining $= \frac{x}{2} - \frac{3x}{8} = 9$

$\Rightarrow \quad \frac{4x - 3x}{8} = 9 \qquad \Rightarrow \quad \frac{x}{8} = 9 \qquad \Rightarrow \quad x = 72$

8. Let the length and breadth of the plot are $11x$ and $4x$ metre.

Length of the fence $= 2$ (length + breadth $) = 2 \times (11x + 4x) = 2 \times 15x = 30x$

Cost $= ₹ 100 \times 30x = 3000x = 75000$

$\Rightarrow \qquad x = 75000 \div 3000 = 25$

Length and breadth are $11 \times 25 = 275$ m, $4 \times 25 = 100$ m

EXERCISE 2.5

1. (a) to (d) : Solve according to Example 16.

(e) to (h) and (j) : Solve according to Example 17.

(i) $\frac{2x-3}{4} - \frac{2x-1}{2} = \frac{x-2}{3}$

$\Rightarrow \quad \frac{2x-3-4x+2}{4} = \frac{x-2}{3}$

$\Rightarrow \quad \frac{-2x-1}{4} = \frac{x-2}{3}$

$\Rightarrow \quad 3(-2x-1) = 4(x-2)$ *(By cross multiplication)*

$\Rightarrow \quad -6x - 3 = 4x - 8$

$\Rightarrow \quad -6x - 4x = -8 + 3$

$\Rightarrow \quad +10x = +5$

$x = \frac{5}{10} = \frac{1}{2}$

EXERCISE 2.6

1. (a) to (f) : Solve according to Example 19.

2. Solve according to Example 20.

3. Let the numerator be x.

Denominator $= x + 7$

$\frac{\text{numerator} + 20}{\text{denominator} - 1} = \frac{5}{3} \quad \Rightarrow \quad \frac{x+20}{x+7-1} = \frac{5}{3} \quad \Rightarrow \quad \frac{x+20}{x+6} = \frac{5}{3}$

$\frac{x+20}{x+6} \times (x+6) \times 3 = \frac{5}{3} \times (x+6) \times 3$

$$3(x+20)=5(x+6)$$
$$3x+60=5x+30$$
$$3x-5x=30-60$$
$$-2x=-30$$
$$x=\frac{-30}{-2}=15$$

$$\text{Rational Number}=\frac{\text{Numerator}}{\text{Denominator}}=\frac{15}{15+7}=\frac{15}{22}$$

M.C.Q.

1. If $\frac{n}{n+15}=\frac{4}{9}$

$\Rightarrow$ $9n = 4\ (x + 15)$ *(By corss multiplication)*

$\Rightarrow$ $9n = 4n + 60$

$\Rightarrow$ $9n - 4n = 60$

$\Rightarrow$ $5n = 60$ $\Rightarrow$ $n=\frac{\overset{12}{\cancel{60}}}{\cancel{5}}=12$

2. If $5=\frac{2}{3}(2x-1)$

$\Rightarrow$ $15=2(2x-1)$ *(By corss multiplication)*

$\Rightarrow$ $15 = 4x - 2$

$\Rightarrow$ $15 + 2 = 4x$

$\Rightarrow$ $17 = 4x$ $\Rightarrow$ $x=\frac{17}{4}$

3. Let number is x, then

$9 + 2x = 67$

$2x = 67 - 9$ $\Rightarrow$ $2x = 58$ $\Rightarrow$ $x=\frac{\overset{29}{\cancel{58}}}{\cancel{2}}=29$

4. Consecutive even number = 2 more = $x + 2$

5. Solve according to Example 20.

6. $3x=\frac{20}{7}-x$

$\Rightarrow$ $3x+x=\frac{20}{7}$

$\Rightarrow$ $4x=\frac{20}{7}$ $\Rightarrow$ $28x = 20$ $\Rightarrow$ $x=\frac{\overset{5}{\cancel{20}}}{\underset{7}{\cancel{28}}}=\frac{5}{7}$

7. $(2x-1)+(x-1)=x+2$

$2x-1+x-1=x+2$

$3x-2=x+2$

$3x-x=2+2$

$2x=4 \quad \Rightarrow \quad x=\frac{\overset{2}{\cancel{4}}}{\cancel{2}}=2$

8. Solve according to Example 14.

EXERCSE 3.1

1, 2, 3, 6 : Take help of the Answer Sheet.

4, 5 : Solve according to Example 3.

7. Solve according to Example 1.

8. Sum of the other two angles $=360°-(75°+\ 95°)=360°-170°=190°$

Measure of each equal angle $=190°\div 2\ =\ 95°$

9. Sum of the other three angles = 360° – 120° = 240°

Measure of each equal angle = 240° ÷ 3 = 80°

10. (a) Sum = $80°+100°+75°+115°=180°+190°=370°$: angles are not of a quadrilateral.

(b) Sum = $25°+100°+50°+185°=360°$: angles are of a quadrilateral.

11. Solve according to Example 2.

EXERCISE 3.2

1. Third exterior angle $=360°-(125°+120°)=360°-245°=115°$

2. Solve according to Example 5.

3. Solve according to Example 6.

4. Solve according to Example 7.

5. A polygon has minimum 3 sides.

It has minimum sum of angles $=180°$

Regular triangle is an equilateral triangle having equal angles.

$$\text{Each angle}=\frac{180°}{3}=60°$$

6. Maximum exterior angle of minimum interior angle of equilateral traingle

$$=180°-60°=120°$$

7. Each exterior angle of an octagon (8 sides, 8 angles) $=\frac{360°}{8}=45°$

So each interior angle of the octagon $=180°-45°=135°$

EXERCISE 3.3

1. Solve according to Example 10.

2. Solve according to Example 11.

3. Sum of other three equal angles $= 360°–90° = 270°$

$$\text{Each angle} = \frac{270°}{3} = 90°$$

4. Solve according to Example 12.

5. Solve according to Example 13.

6. The two lines act as the diagonals bisecting each other at the point of intersection, so the figure is a parallelogram.

7. Let the greater angle is $x°$, Smaller angle $= x° - 30°$

Total of adjacent angles $= x° + x° - 30° = 180°$

$\Rightarrow \quad 2x° - 30° = 180° \qquad \Rightarrow \qquad 2x = 180° + 30° = 210°$

$\Rightarrow \quad x = 210° \div 2 = 105°$

Greater angle $= 105°$, Smaller angle $= 105° - 30° = 75°$

8. (a) Not a parallelogram because two opposite sides are not equal : $AD \neq BC$

(b) It is a parallelogram because two opposite angles are equal : $LB = LD$.

9. (a) $\angle PQR = 180° - 80° = 100°$ (linear pair)

$x = \angle S =$ opposite $\angle PQR = 100°$

$PS \,||\, QR$, PR is transversal,

$\angle QRP = \angle SPR$ (alternate angles)

$y = 40°$

In ΔPQR, $z + y + \angle PQR = 180°$ (angle sum property)

$z + 40° + 100° = 180°$

$\Rightarrow \qquad z + 140° = 180° \qquad \Rightarrow \qquad z = 180° - 140° = 40°$

(b) $y + 7 = 20 \qquad \Rightarrow \qquad y = 20 - 7 = 13$

$x + y = 16 \qquad \Rightarrow \qquad x + 13 = 16 \qquad \Rightarrow \qquad x = 16 - 13 = 3$

EXERCISE 3.4

1. Solve according to Example 15.

2. Solve according to Example 18.

3, 5 : Take help of the Answer Sheet.

4. (a) Like a parallelogram opposite sides of a square are parallel, so a square is also a parallelogram.

(b) Like a rhombus all the four sides of a square are equal, so it is also a rhombus.

(c) Like a rectangle, each angle of a square is 90°, so it is a rectangle.

(d) Like a quadrilateral, a square has 4 sides, so it is also a quadrilateral.

6. A trapezium by definition cannot have all angles equal, because then it will become a rectangle or a square. A trapezium by definition cannot have all sides equal because then it will become a rhombus or a square.

7. To make sure that a slab is rectangular, the mason should check for the properties of a rectangle.

(i) Each angle is 90°. (ii) Diagonals are equal. (iii) Opposite sides are equal.

8. 9. Draw figures and solve yourself.

10. Two diagonals of a rectangle are equal and they bisect at their point of intersection, so the triangle having one angle 30° have two sides each of length equal to half diagonal each. So the other angle = 30° (opposite angles of equal sides)

$$x = 90° - 30° = 60°$$

M.C.Q.

1, 2, 6 and 7 : Take help of the Answer Sheet.

3. Sum of the external angles of a quadrilateral = 360°

4. Perimeter of a rhombus = $4a$, $a = 6$ cm

So, $P = 4 \times 6 = 24$ cm

EXERCISE 4.1 TO 4.3

Take help of Examples 1 to 8.

EXERCISE 5.1 AND 5.2

Take help of Example 1 to 6 and the Answer Sheet.

M.C.Q.

1, 2, 3, 5, 6 and 8 : Take help of the Answer Sheet.

4. Range of data = Maximum value – Minimum value

$= 61 - 20 = 41$

7. Size of class = 175 – 150 = 25

EXERCISE 6.1

Take help of the Answer Sheet.

M.C.Q.

1. Take help of the Answer Sheet.

2. Chance of losting + chance of winning = 1

$$x + \frac{1}{3} = 1$$

$$x = 1 - \frac{1}{3} = \frac{2}{3}$$

3. Sample space = {1, 2, 3, 4, 5. 6} P (n) = 6

Prob. of getting six = $\frac{1}{6}$

4. Sample space = {HH, HT, TH, TT} = 4 Event = {HT, TH} = 2

Prob. = $\frac{2}{4} = \frac{1}{2}$

5. Total = 4 + 7 + 4 = 15

Prob. of red marbles = $\frac{4}{15}$

6. Sample space = (5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20) = 16

Even numbers = (6, 8, 10, 12, 14, 16, 18, 20) = 8

Probability = $\frac{\cancel{8}^{1}}{\cancel{16}_{2}} = \frac{1}{2}$

EXERCISE 7.1

1. (a) (9075) first we find the LCM

Factors = $3 \times \underline{5 \times 5} \times \underline{11 \times 11}$

So it is not a perfect squares.

3	9075
5	3025
5	605
11	121
11	11
	1

(b) 1296

Factors = $\underline{2 \times 2} \times \underline{2 \times 2} \times \underline{3 \times 3} \times \underline{3 \times 3}$

So it is a perfect squares.

2	1296
2	648
2	324
2	162
3	81
3	27
3	9
3	3
	1

(c) and (d) : Solve accordingly above.

2. Take help of the Answer Sheet or Maths Fact at page 70 of the text book.

3. The square of an even number only is an even number. Numbers in (b), (d) and (e) are even numbers so their squares are also even numbers.

4. (a) The sum of first 6 odd numbers is $6^2 = 36$

(b) The sum of first 9 odd numbers is $9^2 = 81$

(c) The sum of first 12 odd numbers is $12^2 = 144$

5. $64 = 8^2$ = sum of first 8 odd numbers.

$= 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15$

6. $169 = 13^2$ = sum of first 13 odd numbers

$= 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19 + 21 + 22 + 23$

7. In the given pattern one digit of 7 is common in all numbers from up to down. In the given pattern one digit of 4 in the beginning and one digit of 9 in the end is common in all numbers.

$7^2 = 49$

$67 = 4489$ one 6, one extra 4, one 8

$667^2 = 444889$ two 6, two extra 4, two 8

$6667^2 = 44448889$ three 6, three extra 4, three 8

So, $666667^2 = 444444888889$ five 6, five extra 4, five 8

8. (a) $13 \times 15 = (14 - 1) \times (14 + 1) = 14^2 - 1^1 = 196 - 1 = 195$

(b) (c) (d) (e) : Solve according to (a)

9. (a) $76^2 - 75^2 = (76 + 75)(76 - 75) = 151 \times 1 = 151$

(b) (c) (d) (e) : Solve according to (a)

10. and 11. : Solve according to Example 2.

12. We know that the largest 3-digit number is 999. Which is not a perfect square. Let's take the square root of 999

$\Rightarrow \sqrt{999} = 31.606$

Now, rounded off the 31.606. i.e. 31.

Now, square the rounded off

$\Rightarrow (31)^2 = 961$

$\therefore$ 961 is the largest 3-digit number which is a perfect square.

EXERCISE 7.2

1. and 2. : Solve according to the method given on page 77 of the text book.

3. Solve according to Example 6.

4. Solve according to Example 7.

EXERCISE 7.3

1. and 4. : Solve according to Example 8.

2. Solve according to Example 10.

3. Solve according to Example 11.

5. Solve according to Example 12.

6, 7 and 8 : Solve according to Example 13.

9. (a) $\left.\begin{array}{l}\text{square root of } 169 = 13\\ \text{square root of } 324 = 18\end{array}\right\}$ Do by prime factorization

$$\text{square root of } \frac{169}{324} = \frac{13}{18}$$

10. square root of $2025 = 45$

square root of $0.002025 = 0.045$

Six decimal places are halved to three decimal places.

(a), (b), (c), (d) : Solve according to (e).

11. Use the pythagorean theorem :

$a^2 + b^2 = c^2$; a and b are sides, c is the hypotenus

So, $(12)^2 + b^2 = (13)^2$

$144 + b^2 = 169$

$b^2 = 169 - 144$

$b = \sqrt{25} = 5$ cm

EXERCISE 7.4

1. (a) 81: Number of digits = 2 (even),

$$\text{Number of digits in the square root} = \frac{2}{2} = 1$$

(b) 169 : Number of digits = 3 (odd),

$$\text{Number of digits in the square root} = \frac{3+1}{2} = \frac{4}{2} = 2$$

(c), (d), (e) : Solve according to (a)

2. Solve according to division method given on page 78-79 of the text book.

3, and 7 : Solve according to the method given on page 79 (up) of the text book.

4. Solve according to Example 14.

5. and 6. : Solve according to Example 16.

8. (a) Two perfect square numbers near to 90 are 81 and 100.

$81 < 90 < 100 \quad \Rightarrow \quad \sqrt{81} < \sqrt{90} < \sqrt{100} \quad \Rightarrow \quad 9 < \sqrt{90} < 10$

But 90 is more closer to 81 than to 100

So $\sqrt{90}$ is approximately 9.

(b), (c), (d), (e) : Solve according to (a).

10. Solve according to Example 15.

M.C.Q.

1. Square of 86 = $(86)^2$

$= 86 \times 86 = 7396$

2. 3, 4 and 7 : Take the help of the Answer Sheet.

5. Solve according to Example 13.

6. Solve according to Example 11.

8. Solve according to Example 12.

EXERCISE 8.1

1. Take help of the Maths Facts on page 82 of the text book.

2, 3 : Solve according to Example 1 and 2.

4. Solve according to Example 3.

5. Solve according to Example 4.

6. Solve according to Example 1 and 2.

7. Solve according to Example 5.

EXERCISE 8.2

1. Solve according to Example 6.

2. (a) 4913

4913 has 4 digits, so its cube root has 2 digits. Form groups of three digits starting from the right most digit. Here one group is 913 and other group has only one digit 4.

In 913, the ones digit is 3. So the ones digit of the cube root of 4913 is 7.

In second group, 4 lies between two perfect cubes 1 and 8. As 4 is less than 8, so the tens digit of the cube root is 1.

$\therefore$ The cube root of 4913 = 17

(b) to (e) : Solve according to (a).

3. (a) Cube root of a negative number is negative.

Cube root of $729 = 9$, cube root of $(-729) = -9$

(b) Cube root of $\dfrac{-1331}{512} = \dfrac{(\text{cube root of } -1331)}{(\text{cube root of } 512)} = \dfrac{-11}{8}$

(c) Solve according to (b).

(e) Cube root of $4096 = 16$.

The number of decimal places in the cube root of a decimal number is one third of the number of decimal places in that number.

So cube root of $0.004096 = 0.16$

(d) Solve according to (e).

4. (a) $\sqrt[3]{0.216}$

$\sqrt[3]{216} = 6$

The number of decimal places in the cube root of a decimal number is one third of the number of decimal place in that number.

So, $\sqrt[3]{0.216} = 0.6$

(b) and **(c)** : Solve according to (a).

5. L.H.S. $= \sqrt[3]{27} \times \sqrt[3]{125}$

$= \sqrt[3]{3 \times 3 \times 3} \times \sqrt[3]{5 \times 5 \times 5}$

$= 3 + 5 = 15$

R.H.S. $= \sqrt[3]{27 \times 125}$

$= \sqrt[3]{3 \times 3 \times 3 \times 5 \times 5 \times 5}$

$= 3 \times 5 = 5$

6. $\sqrt[3]{3375 \times 729}$

$= \sqrt[3]{3 \times 3 \times 3 \times 5 \times 5 \times 5 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}$

$= 3 \times 5 \times 3 \times 3 = 135$

7. $17496 = \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3} \times \underline{3 \times 3 \times 3} \times 3$

3 does not appear in group of three,

So if we divide 17496 by 3, the quotient will be a perfect cube.

$17496 \div 3 = \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3} \times \underline{3 \times 3 \times 3}$

$= 2^3 \times 3^3 \times 3^3$

$= (2 \times 3 \times 3)^3$

$= 18^3 = 5832$

$\sqrt[3]{5832} = 18$

2	17496
2	8748
2	4374
3	2187
3	729
3	243
3	81
3	27
3	9
3	3
	1

M.C.Q.

1. $(0.8)^3 = ?$

$= (0.8) \times (0.8) \times (0.8)$

$= (0.512)$

2. Cube of 47

$\sqrt[3]{47} = 3.608 = 3$

3. $\sqrt[3]{125 \times 64}$

$\sqrt[3]{8000}$

$\underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{5 \times 5 \times 5}$

$\Rightarrow 2 \times 2 \times 5$

$= 20$

2	8000
2	4000
2	2000
2	1000
2	500
2	250
5	125
5	25
5	5
	1

4. $\left(1\frac{3}{10}\right)^3 = ?$

$\Rightarrow \left(1\frac{3}{10}\right)^3 = \left(\frac{13}{10}\right)^3 = \frac{13}{10} \times \frac{13}{10} \times \frac{13}{10}$

$= \frac{13 \times 13 \times 13}{1000} = \frac{2197}{1000} \quad \Rightarrow \quad 2\frac{197}{1000}$

5. $\sqrt[3]{-1728} + \sqrt{324}$

$\sqrt[3]{-1728}$

$\Rightarrow -(\underline{2 \times 2 \times 2} \times \underline{2 \times 2 \times 2} \times \underline{3 \times 3 \times 3})$

$\Rightarrow -(2 \times 2 \times 3)$

$= -12$

2	1728
2	864
2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

$\sqrt{324}$

$\Rightarrow \underline{2 \times 2} \times \underline{3 \times 3} \times \underline{3 \times 3}$

$= 2 \times 3 \times 3$

$\Rightarrow 18$

$\Rightarrow -12 + 18$

$= 6$

2	324
2	162
3	81
3	27
3	9
3	3
	1

6. $\sqrt[3]{-\frac{192}{81}}$

$\frac{\sqrt[3]{-192}}{\sqrt[3]{81}}$

$= \sqrt[3]{\frac{-(2\times 2\times 2\times 2\times 2\times 2\times 3)}{3\times 3\times 3\times 3}}$

$\Rightarrow \frac{-(2\times 2)}{3} = \frac{-4}{3}$

2	192
2	96
2	48
2	24
2	12
2	6
3	3
	1

3	81
3	27
3	9
3	3
	1

7. Cube root of 12977875

$\sqrt[3]{12977875}$

$= \underline{5 \times 5 \times 5} \times \underline{47 \times 47 \times 47}$

$= 5 \times 47$

$= 235$

The number of digits is 3.

5	12977875
5	2595575
5	519115
47	103823
47	2209
47	47
	1

8. $\sqrt[3]{2.197} + \sqrt{0.0049}$

Remove decimal = 2197

$\Rightarrow 13 \times 13 \times 13$

Add decimal

$\Rightarrow 1.3 \times 1.3 \times 1.3$

$\Rightarrow \sqrt[3]{2.197} = 1.3$

$\sqrt{0.0049} = \frac{49}{10000} = \frac{7\times 7}{10000}$

$\Rightarrow \sqrt{0.07\times 0.07} = 0.07$

$\Rightarrow 1.3 + 0.07$

$\Rightarrow 1.37$

13	2197
13	169
13	13
	1

7	49
7	7
	1

EXERCISE 9.1

1. $50\text{ m to }5\text{ km} = 50\text{ m to }5000\text{ m} = 50\text{ m} : 5000\text{ m} = 1:100$

(b), (c) : Solve according to (a).

2. $1:2 = \frac{1}{2} = \frac{1}{2} \times 100\,\% = 50\,\%$

(b), (c) (d), (e) : Solve according to (a).

3. (a) $\frac{1}{4} = \frac{1}{4} \times 100\,\% = 25\,\%$ (b) $\frac{2}{5} = \frac{2}{5} \times 100\,\% = 40\,\%$

(c) $0.35 = 0.35 \times 100\,\% = 35\%$

(d) $0.146 = 0.146 \times 100\% = 14.6\%$

(e) $\frac{2}{3} = \frac{2}{3} \times 100\% = \frac{200}{3}\,\% = 66\frac{2}{3}\,\%$

4. (a) $40\,\% = \frac{40}{100} = \frac{2}{5}, 40\,\% = \frac{40}{100} = 0.4$

(b) Solve according to (a)

(c) $12\frac{1}{2}\,\% = \frac{25}{2}\,\% = \frac{25}{2} \times \frac{1}{100} = \frac{1}{8}$

$\frac{1}{2} = 0.5, 12\frac{1}{2}\,\% = 12.5\,\% = \frac{12.5}{100} = 0.125$

(d) $23\frac{3}{4}\,\% = \frac{95}{1}\,\% = \frac{95}{4} \times \frac{1}{100} = \frac{19}{80}$

$\frac{3}{4} = 0.75, 23\frac{3}{4}\,\% = 23.75\,\% = \frac{23.75}{100} = 0.2375$

(e) $33\frac{1}{3}\,\% = \frac{100}{3}\,\% = \frac{100}{3} \times \frac{1}{100} = \frac{1}{3}$

$\frac{1}{3} = 0.33\,;\, 33\frac{1}{3}\,\% = 33.33\,\% = \frac{33.33}{100} = 0.3333$

5. (a) $50\,\% = \frac{50}{100} = \frac{1}{2} = 1:2$

(b), (c), (d), (e) : Solve according to (a).

6. (a) $15\,\%\text{ of }₹\,5500 = \frac{15}{100} \times 5500 = ₹\,825$

(b), (c), (d) : Solve according to (a).

7. 12 % decrease means ₹ 100 decreased to $100 - 12 = ₹\,88$

₹ 1 decreased to $₹\,\frac{88}{100}$

₹ 52, 500 decreased to $₹\,\frac{88}{100} \times 52500 = ₹\,46{,}200$

8. $15\,\%\text{ of }25\,\% = \frac{15}{100} \times 25\,\% = \frac{15}{4}\,\% = 3\frac{3}{4}\,\% = 3.75\,\%$

9. $\text{Calcium} = 10\%\text{ of }250\,\text{g} = \frac{10}{100} \times 250 = 25\,\text{g}$

$\text{Carbon} = 3\,\%\text{ of }250\,\text{g} = \frac{3}{100} \times 250 = \frac{15}{2} = 7.5\,\text{g}$

$\text{Oxygen} = 12\,\%\text{ of }250\,\text{g} = \frac{12}{100} \times 250 = 30\,\text{g}$

10. $5\,\%\text{ of girls} = 5\,\%\text{ of }160 = \frac{5}{100} \times 160 = 8$

Remaining girls $= 160 - 8 = 152$

Total numbers of pupils = girls + boys $= 152 + 76 = 228$

Percentage of boys $= \frac{76}{228} \times 100\,\% = \frac{100}{3}\,\% = 33\frac{1}{3}\,\%$

11. Error $= 12\frac{1}{2}^\circ - 12^\circ = \frac{1}{2}^\circ$.

$\text{Percentage of error} = \left(\frac{1}{2} \div 12\frac{1}{2}\right) \times 100\,\%$

$= \left(\frac{1}{2} \div \frac{25}{2}\right) \times 100\,\% = \frac{1}{2} \times \frac{2}{25} \times 100\,\% = 4\,\%$

12. 40 % increase means, 100 cm increased to 140 cm.

1 cm increased to $\frac{140}{1000}$

$15\,\text{cm}$ increased to $\frac{140}{100} \times 15 = 21\,\text{cm}$

10 cm increased to $\frac{140}{100} \times 10 = 14\,\text{cm}$

Original area of the rectangle $= 15\,\text{cm} \times 10\,\text{cm} = 150\,\text{cm}^2$

Increased area of the rectangle $= 21\,\text{cm} \times 14\,\text{cm} = 294\,\text{cm}^2$

Increase in area $= 294\,\text{cm}^2 - 150\,\text{cm}^2 = 144\,\text{cm}^2$

Percentage increase $= \frac{144}{150} \times 100\,\% = 48 \times 2 = 96\,\%$

13. Money left $= 100\,\% - 70\,\% = 30\,\%$

$30\,\%$ money is ₹ 1800

$1\,\%$ money is ₹ $\frac{1800}{30}$

$100\,\%$ money is ₹ $\frac{1800}{30} \times 100 =$ ₹ 6000

14. Percentage of people who like other games $= 100\,\% - (60\,\% + 30\,\%)$

$= 100\,\% - 90\,\% = 10\,\%$

Number of people who like cricket

$$= 60\,\% \text{ of } 45{,}000 = \frac{60}{100} \times 45000 = 27{,}000$$

Number of people who like football

$$= 30\,\% \text{ of } 45{,}000 = \frac{30}{100} \times 45000 = 13{,}500$$

Number of people who like other games

$$= 10\,\% \text{ of } 45{,}000 = \frac{10}{100} \times 45000 = 4{,}500$$

15. Solve according to Example 6.

16. Let the price of certain weight of tomato was ₹ 100.

Increase of $20\,\%$ means it became $100 + 20 = 120$

Decrease of $30\,\%$ means, ₹ 100 decreased to ₹ $100 - 30 =$ ₹ 70

₹ 1 decreased to $\frac{70}{100}$

₹ 120 decreased to ₹ $\frac{70}{100} \times 120$

$=$ ₹ 84

Net decrease $=$ ₹ $100 -$ ₹ $84 =$ ₹ 16

This decrease is at ₹ 100

Net decrease per cent $= 16\,\%$

17. $20\,\text{g}$ sugar is present in $20\,\text{g} + 60\,\text{g} = 80\,\text{g}$ of solution

$$\text{Per cent of sugar} = \frac{20\,\text{g}}{80\,\text{g}} \times 100\,\% = 25\,\%$$

Let x grams of sugar are added to make it a $40\,\%$ solution

$$\text{Total sugar} = (20 + x)\,\text{g}$$

$$\text{Total solution} = (80 + x)\,\text{g}$$

$$\frac{20+x}{80+x}\times 100\,\%=40\,\%$$

$$\frac{(20+x)}{(80+x)}\times 100\times(80+x)=40\times(80+x)$$

$$(20+x)\times 100=40\times(80+x)$$

$$2000+100x=3200+40x$$

$$\Rightarrow \quad 100x-40x=3200-2000$$

$$\Rightarrow \quad 60x=1200$$

$$\Rightarrow \quad x=1200\div 60=20$$

Hence 20 g sugar should be added more to make it a 40 % solution.

EXERCISE 9.2

1. (a) $SP=\frac{100+\text{Profit }\%}{100}\times CP=\frac{100+15}{100}\times 5000=\frac{115}{100}\times 5000=₹5750$

(b) $SP=\frac{100-\text{Loss }\%}{100}\times CP=\frac{100-4}{100}\times 5600=\frac{96}{100}\times 5600=₹5376$

2. (a) $\text{CP}=\frac{100}{100+\text{Profit}\%}\times SP=\frac{100}{100+9}\times 545=\frac{100}{109}\times 545=₹500$

(b) $CP=\frac{100}{100-\text{Loss }\%}\times SP=\frac{100}{100-3\,\%}\times 873=\frac{100}{97}\times 873=₹900$

3. Solve according to Example 9.

4. Solve according to Q. 2 (a).

5. If the cost price is ₹100. At a profit of 15 %, $SP=100+15=₹115$

At a profit of 25%, $SP=100+25=₹125$

Difference $=₹125-₹115=₹10$

When the difference is ₹10, $CP=₹100$

₹1, $CP=₹\frac{100}{10}$

₹40, $CP=₹\frac{100}{10}\times 40=₹400$

6. Solve according to Example 11.

7. CP (including repairs) $=₹2500+₹500=₹3000$

$SP=₹3300$, gain $=₹3300-₹3000=₹300$

$$\text{Profit (Gain) per cent} = \frac{\text{Profit}}{\text{CP}} \times 100\,\% = \frac{300}{3000} \times 100\,\% = 10\,\%$$

8. $CP = ₹10 \times 200 = ₹2000$

$SP = ₹12 \times (200 - 5) = ₹12 \times 195 = ₹2340$

Gain (profit)$= ₹2340 - ₹2000 = ₹340$

$$\text{Gain (profit) \%} = \frac{\text{profit}}{CP} \times 100\,\% = \frac{340}{2000} \times 100\,\% = 17\,\%$$

9. Solve according to Example 10.

10. Let $7 \times 5 = 35$ toffees are bought.

$$CP = ₹\frac{35}{7} = ₹5;\ SP = ₹\frac{35}{5} = ₹7$$

$$\text{Profit} = ₹7 - ₹5 = ₹2$$

$$\text{Gain (profit) \%} = \frac{\text{profit}}{CP} \times 100\,\% = \frac{2}{5} \times 100\,\% = 40\,\%$$

11. Let $12 \times 10 = 120$ bananas are bought.

$$CP = \frac{10}{12} \times 120 = ₹100;\ SP = \frac{12}{10} \times 120 = ₹144$$

$$\text{Gain (profit)} = ₹144 - ₹100 = ₹44$$

$$\text{Gain (profit) \%} = \frac{\text{profit}}{CP} \times 100\,\% = \frac{44}{100} \times 100\,\% = 44\,\%$$

EXERCISE 9.3

1, 3 : Solve according to Example 16.

2. Solve according to Example 14.

4. $$SP = \frac{100 - \text{Discount\%}}{100} \times MP = \frac{100 - 20}{100} \times 750 = \frac{80}{100} \times 750 = ₹600$$

5. $$MP = \frac{100}{100 - \text{Discount \%}} \times SP = \frac{100}{100 - 5} \times 5225 = \frac{100}{95} \times 5225 = ₹5500$$

6. Total marked price for a pair of jeans and two shirts

$$= ₹1450 + ₹850 \times 2 = ₹1450 + ₹1700 = ₹3150$$

$$SP = \frac{100 - \text{Discount \%}}{100} \times MP = \frac{100 - 10}{100} \times 3150 = \frac{90}{100} \times 3150 = ₹2835$$

7. Cost of a pair of roller skates $= ₹450$

$$\text{Sales Tax} = 5\,\% \text{ of } ₹450 = \frac{5}{100} \times 450 = ₹22.50$$

Bill amount $= SP = ₹450 + ₹22.50 = ₹472.50$

8. 10 % VAT means,

When price including VAT is $100 + 10 = ₹110$, original price $= ₹100$

When price including VAT is ₹ 1, original price $= ₹\frac{100}{110}$

When price including VAT is ₹3300, original price $= ₹\frac{100}{110} \times 3300 = ₹3000$

M.C.Q.

1. 20% of ₹500

$= \frac{20}{100} \times 500 = 100$

2. 3% of 5%

$= \frac{3}{100} \times 5\% = \frac{3}{20}\$ = 0.15\%$

3. SP = ₹950, Loss = 5%

Let the CP be ₹ x then $950 = \left(\frac{95}{100}\right)x$

$\Rightarrow x = \left(\frac{950 \times 100}{95}\right) = 1000$

Now, CP = ₹1000 SP = ₹1040

Profit % $= \left(\frac{1040 - 1000}{1000} \times 100\right)\% = 4\%$

4. Let cost price of an article = ₹ x

When SP is ₹340, then gain % $= \frac{340 - x}{x} \times 100$

When SP is ₹350, than gain % $= \frac{350 - x}{x} \times 100$

Now, if 5% more is gained by selling an article for rupees 350 than by selling it for ₹340

Then, $\left[\frac{350 - x}{x} \times 100\right] - \left[\frac{340 - x}{x} \times 100\right] = 5$

$\Rightarrow \frac{100}{x}[350 - x - 340 + x] = 5$

$\Rightarrow \frac{100}{x} = 5 \qquad \Rightarrow x = \frac{1000}{5}$

$\Rightarrow x = ₹200$ = CP of an article

5. Suppose the cost price of goods be x. Then, 20% of x is $\frac{20x}{100}$ i.e. $\frac{x}{5}$.

According to the parenthesis, the marked price is 20% higher above the cost price. This means, marked price of goods $= x + \frac{x}{5} = \frac{6x}{5}$.

Now, 10% of $\frac{6x}{5}$ is $\frac{6x}{5} \times \frac{10}{100} = \frac{6x}{50}$

Again according to the parenthesis, the shopkeeper gives 10% discount. Then, selling price of goods $= \frac{6x}{5} - \frac{6x}{50}$

$$= \frac{60x - 6x}{50} = \frac{54x}{50}$$

Then, netgain = Selling Price – Cost Price

$$\Rightarrow \quad \frac{54x}{50} - x = \frac{4x}{50}$$

So, gain percentage $= \frac{\text{net gain} \times 100}{\text{cost price}}$

$$= \frac{\left(\frac{4x}{50}\right) \times 100}{x} = \frac{4x \times 100}{50x} = 8\%$$

Therefore gain percent is 8%.

6. Let the cost price of article = ₹ x

If article sells at a gain of 10% = 110% of CP

If article sells at loss of 20% then SP = 80% of CP

$$= 80\% \text{ of } x$$

Therefore, 110% of x – 80% of x = 2

$$\frac{110}{100} \times x - \frac{80}{100} \times x = 12$$

$$\frac{30x}{100} = 12 \qquad \Rightarrow \qquad 30x = 1200$$

$$x = \frac{\overset{40}{\cancel{1200}}}{\cancel{300}} = 40$$

The cost price of articles is ₹40.

7. Let original price be 'x'

So $\quad x + \left(\frac{10}{100}\right) \times x = 825 \qquad \Rightarrow \qquad x + \left(\frac{10x}{100}\right) = 825$

$$\left(\frac{100x+10x}{100}\right)=825 \qquad \Rightarrow \qquad \frac{110x}{100}=825$$

$$=110x=82500 \qquad \text{(cross multiply)}$$

$$x=\frac{\overset{750}{\cancel{82500}}}{\cancel{110}}=750$$

So, the original price = ₹750

8. Let the cost price of the good be ₹x

Marked price $=x+\frac{20}{100}=\frac{120x}{100}$

Selling price = Marked Price – % discount on marked price

$$=\frac{120x}{100}-\left(\frac{120x}{100}\right)\left(\frac{20}{100}\right)$$

$$=\frac{120x}{100}\left(1-\frac{20}{100}\right)$$

$$=\frac{120x}{100}\left(\frac{80}{100}\right)$$

$$=\frac{\overset{24}{\cancel{120}}x}{\underset{25}{\cancel{100}}}\times\frac{\overset{4}{\cancel{80}}}{\underset{5}{\cancel{100}}} \quad \Rightarrow \frac{24x}{25}$$

$$\%\text{ gain precent}=\frac{\text{Selling price}-\text{Cost price}}{\text{Cost price}}\times 100$$

$$=\frac{\frac{24}{25}x-x}{x}\times 100$$

$$=\frac{\frac{24x-25x}{25}}{x}\times 100$$

$$\Rightarrow \qquad \frac{-x}{\cancel{25}x}\times\overset{4}{\cancel{100}}=-4\% \qquad \text{He loss}$$

EXERCISE 10.1

1. Number of days of the deposit $=31-11+29+31+30+31+5=146$ days

$$146 \text{ days}=\frac{146}{365}\text{ year}=\frac{2}{5}\text{ year}$$

$$\text{Interest}=\frac{PRT}{100}=2400\times\frac{15}{2}\times\frac{2}{5}\times\frac{1}{100}=₹72$$

2. 'Double itself' means ₹100 interest on ₹100 principal

$$\text{Time} = \frac{100 \times \text{interest}}{P \times R} = \frac{100 \times 100}{100 \times 8} = \frac{25}{2} = 12\frac{1}{2} \text{ years}$$

3. Solve according to Example 3.

4. Solve according to Example 4.

5, 6; Solve according to Example 6.

7, 8; Solve according to Example 7.

9, 10; Solve according to Example 8.

11, 12; Solve according to Example 9.

13. Time = 9 months = 3 × 3 months = 3 quarter years

Interest is compounded yearly

$$\text{Rate of interest quarterly} = \frac{10}{4}\% = \frac{5}{2}\%$$

$$\text{Amount} = \text{Principal}\left(1 + \frac{R}{100}\right)^T = 8000\left(1 + \frac{5}{2 \times 100}\right)^3$$

$$= 8000\left(1 + \frac{1}{40}\right)^3 = 8000 \times \frac{41}{40} \times \frac{41}{40} \times \frac{41}{40} = \frac{41 \times 41 \times 41}{8} = 8615\frac{1}{8}$$

Compound Interest = Amount – Principal

$$= ₹\,8615\frac{1}{8} - ₹\,8000 = ₹\,615\frac{1}{8} = ₹\,615.13$$

EXERCISE 10.2

1. Population at present $= 1{,}00{,}000\left(1 + \frac{5}{100}\right)^3 = 1{,}00{,}000\left(1 + \frac{1}{20}\right)^3$

$$= 1{,}00{,}000 \times \frac{21}{20} \times \frac{21}{20} \times \frac{21}{20}$$

$$= \frac{25 \times 21 \times 21 \times 21}{2} = 1{,}15{,}763\frac{1}{2} = 1{,}15{,}763 \text{ (approx)}$$

2. Solve according to Example 13.

3. Let the population 2 years before be P.

$$A = P\left(1 + \frac{R}{100}\right)^T = P\left(1 + \frac{5}{100}\right)^2$$

$$= P\left(1 + \frac{1}{20}\right)^2 = P\left(\frac{21}{20}\right)^2$$

According to the question,

$$P\left(\frac{21}{20}\right)^2 = 54{,}000$$

$$\Rightarrow \quad P = 54{,}000 \times \left(\frac{20}{21}\right)^2 = 54{,}00 \times \frac{20}{21} \times \frac{20}{21} = 48{,}980 \text{ (approx)}$$

Hence, the population 2 years before was 48,980 (approx)

Now, $P = 54{,}000$, $R = 5\,\%$, Time = 2 years after

$$A = P\left(1 + \frac{R}{100}\right)^T = 54{,}000\left(1 + \frac{5}{100}\right)^2$$

$$= 54{,}000\left(1 + \frac{1}{20}\right)^2 = 54{,}000\left(\frac{21}{20}\right)^2 = 54{,}000 \times \frac{21}{20} \times \frac{21}{20} = 59{,}535$$

Hence, the population after 2 years will be 59,535

4. Solve according to Example 12.

5. Population after two years $= P\left(1 - \frac{r_1}{100}\right)\left(1 - \frac{r_2}{100}\right)$

$$= 15000\left(1 - \frac{5}{100}\right)\left(1 - \frac{8}{100}\right)$$

$$= 15000\left(1 - \frac{1}{20}\right)\left(1 - \frac{2}{25}\right)$$

$$= 15000 \times \frac{19}{20} \times \frac{23}{25} = 13110$$

6. Capital after 3 years

$$= \text{capital in the beginning} \times \left(1 + \frac{5}{100}\right)\left(1 + \frac{10}{100}\right)\left(1 + \frac{15}{100}\right)$$

$$= ₹\,40{,}000 \times \left(1 + \frac{1}{20}\right)\left(1 + \frac{1}{10}\right)\left(1 + \frac{3}{20}\right)$$

$$= ₹\,40{,}000 \times \frac{21}{20} \times \frac{11}{10} \times \frac{23}{20} = 53{,}130$$

Total profit for three years $= ₹\,5{,}3130 - ₹\,40{,}000 = ₹\,13{,}130$

Note : In this case the form of formula is

$$A = P\left(1 + \frac{R_1}{100}\right)\left(1 + \frac{R_2}{100}\right)\left(1 + \frac{R_3}{100}\right)$$

7. Solve according to Example 13.

M.C.Q.

1. Given here, SI = 80, $r = 4\%$, t = 2

then $$P = \frac{SI \times 100}{RT}$$

$$= \frac{\overset{10}{\cancel{20}}\cancel{80} \times 100}{\cancel{4} \times \cancel{2}} = 1000$$

$$A = P\left(i + \frac{R}{100}\right)^T$$

$$= 1000\left(1 + \frac{4}{100}\right)^2$$

$$= 1000 \times \left(\frac{104}{100}\right)^2$$

$$= 1000 \times (1.04)^2$$

$\Rightarrow 1000 \times 1.0816 \quad \Rightarrow 1081.6$

So, 1081.6 – 1000 = 81.6

2. $$P = \frac{SI \times 100}{R \times T}$$

$$= \frac{240 \times 100}{8 \times 3} \quad \Rightarrow \quad \frac{\overset{10}{\cancel{240}} \times 100}{\cancel{24}}$$

$= 10 \times 100 = 1000$

3. Simple Interest $= \frac{\cancel{1000} \times 2 \times 10}{\cancel{100}} = 200$

Compund Interest $$= 1000\left(\left(1 + \frac{10}{100}\right)^2 - 1\right)$$

$$= 10\cancel{00}\left(\frac{121 - 100}{\cancel{100}}\right)$$

$= 10 \times 21 = 210$

Difference between simple and compund interest = 210 – 200 = 10

4. P = 400 SI = 96 R = 8% T = ?

$$SI = \frac{P \times R \times T}{100}$$

$\Rightarrow \quad 96 = \frac{\cancel{400} \times 8 \times T}{\cancel{100}}$

$\Rightarrow \quad 96 = 32\ T \quad \Rightarrow\ T = \frac{\overset{3}{\cancel{96}}}{\cancel{32}} = 3$ years

5. P = 8650, I = 8% Half yearly $= \frac{8}{2} = 4\%$

Time = 1 year So n = 2 as it is compuded semi annualy

Now we know that, $A = P\left(1 + \frac{R}{100}\right)^n$

$= 6250\left(1 + \frac{4}{100}\right)^2 \quad \Rightarrow \quad 6250\left(\frac{104}{100}\right)^2$

$\Rightarrow\ 6250 \times (1.04)^2$

$= 6250 \times 1.0816 = 6760$

Compound interest $= 6760 - 6250 = 510$

6. A = 4913, P = ?, $R = 6\frac{1}{4}\%$ p.a. $= \frac{25}{4}\%$ p.a. T = 3 years

$$A = P\left(1 + \frac{R}{100}\right)^T$$

$$4913 = P\left(1 + \frac{25}{4 \times 100}\right)^3$$

$$4913 = P\left(\frac{17}{16}\right)^3$$

$$4913 = P \times \frac{17}{16} \times \frac{17}{16} \times \frac{17}{16}$$

$$P = \frac{4913 \times 16 \times 16 \times 16}{17 \times 17 \times 17} = \frac{\cancel{4913} \times 4096}{\cancel{4913}}$$

$$P = 4096$$

7. P = 7500, A = 8427, n = 2 years, R =?

Now, $A = P\left[1 + \frac{R}{100}\right]^n$

$$8427 = 7500\left[1 + \frac{R}{100}\right]^2$$

$$\frac{8427}{7500} = \left[1 + \frac{R}{100}\right]^2$$

$$\frac{91.79}{86.60} = 1 + \frac{R}{100}$$

$$\frac{91.79 - 86.60}{86.60} = \frac{R}{100}$$

$$\Rightarrow \quad \frac{5.19}{86.60} = \frac{R}{100} \qquad \Rightarrow \; 0.059 \times 100 = R$$

$$\Rightarrow \quad R = 5.90 = 6\%$$

8. $A = P\left[1 + \frac{r}{100}\right]^n$

$$= 10000\left(1 + \frac{12}{100}\right)^3$$

$$= 10000\left(\frac{112}{100}\right)^3$$

$$= 10000 \times \frac{112}{100} \times \frac{112}{100} \times \frac{112}{100}$$

$$\Rightarrow \quad \frac{112 \times 112 \times 112}{100}$$

$$\Rightarrow \quad \frac{1404928}{100} \qquad \Rightarrow \qquad 14049.28$$

Interest = 14049.28 – 10000 = 4049.28

EXERCISE 11.1

1. to 6 : Take help of the Answer Sheet.

7. (a) (d) (e) : Solve according to Example 1.

(b) (c) (f) : Solve according to Example 2

8. Solve according to Example 3.

EXERCISE 11.2

1. (a) $-4p \times 7p = -4 \times 7 \times p \times p = -28p^{1+1} - 28p^2$

(b) $-5x \times 6xy = -5 \times 6 \times x \times x \times y = -30x^{1+1}y = -30x^2 y$

(c) $3z^2 \times (-3z) = 3 \times (-3) \times z^2 \times z = -9z^{2+1} = -9z^3$

2. Solve according to Example 4.

3. Solve according to Example 5.

4. (a) $(-3x^2) \times (-4xy) \times 7x^2 y = (-3) \times (-4) \times 7 \times x^2 \times x \times x^2 \times y \times y$

$$= 84x^{2+1+2} y^{1+1} = 84x^5 y^2$$

(b) to (f) : Solve according to (a).

5. (a) $(a^2 - 9) \times 4a = a^2 \times 4a - 9 \times 4a = 4a^3 - 36a$

(b) $5xy \times (x + y - 5) = 5xy \times x + 5xy \times y + 5xy \times (-5) = 5x^2 y + 5xy^2 - 25xy$

(c) $4p^2q^2 \times (p^2 - q^2) = 4p^2q^2 \times p^2 + 4p^2q^2 \times (-q^2)$

$= 4p^{2+2}q^2 - 4p^2q^{2+2} = 4p^4q^2 - 4p^2q^4$

6. (a) $(a^3) \times (2a^{12}) \times (6a^{16}) = 2 \times 6 \times a^3 \times a^{12} \times a^{16} = 12a^{3+12+16} = 12a^{31}$

(b) $\left(-\frac{7}{5}p^3q\right) \times \left(\frac{15}{14}pq^3\right) = -\frac{7}{5} \times \frac{15}{14} \times p^3 \times p \times q \times q^3$

$= -\frac{3}{2}p^{3+1} \times q^{1+3} = -\frac{3}{2}p^4q^4$

(c) Solve according to (b).

7. $2x(z - x - y) + 2y(z - y - x) = 2xz - 2x^2 - 2xy + 2yz - 2y^2 - 2xy$

$= 2xz + 2yz - 2x^2 - 2y^2 - 4xy$

8. $5xy(3x^2 - 2x + 1) - 2x^2(xy - 5y)$

$= 5xy \times 3x^2 + 5xy \times (-2x) + 5xy \times 1 - 2x^2 \times xy - 2x^2 \times (-5y)$

$= 15x^3y - 10x^2y + 5xy - 2x^3y + 10x^2y$

$= 15x^3y - 2x^3y - 10x^2y + 10x^2y + 5xy$

$= 13x^3y + 5xy$

9. (d) $3x^3y(x^2y^2 + 4yz - y^2z)$

$= 3x^3y \times x^2y^2 + 3x^3y \times 4yz + 3x^3y \times (-y^2z)$

$= 3x^{3+2}y^{1+2} + 3 \times 4x^3y^{1+1}z - 3x^3y^{1+2}z$

$= 3x^5y^3 + 12x^3y^2z - 3x^3y^3z$

(a), (b), (c) : Solve according to (d).

EXERCISE 11.3

1. Solve according to Example 7.

2, 3 : Solve according to Example 8.

4. (a) $(a + b)(2a - 3b + c) - (2a - 3b)c$

$= a(2a - 3b + c) + b(2a - 3b + c) - (2a - 3b)c$

$= 2a^2 - 3ab + ac + 2ab - 3b^2 + bc - 2ac + 3bc$

$= 2a^2 - 3b^2 - 3ab + 2ab + ac - 2ac + bc + 3bc$

$= 2a^2 - 3b^2 - ab - ac + 4bc$

(b), (c) : Solve according to (a).

EXERCISE 11.4

1. (a), (e), (f) : Solve according to Example 11, 12.

(b), (c), (d) : Solve according to Example 9.

2. (e) $6a^2b^2 - 3abc + 9abd$ by $-\frac{1}{3}ab$

$$= \frac{6a^2b^2}{-\frac{1}{3}ab} = -18ab$$

$$= \frac{3abc}{-\frac{1}{3}ab} = -9c$$

$$= \frac{9abd}{-\frac{1}{3}ab} = -27d$$

$$\therefore \quad \frac{6a^2b^2 - 3abc + 9abd}{-\frac{1}{3}ab} = -18ab - (-9c) = (-27d)$$

$= -18\text{ ab} + 9\text{c} - 27\text{ d}$

Solve remaining parts according to Example 11, 12.

EXERCISE 11.5

1. (a), (e) Solve according to Example 13 (a).

(b), (f), (i), (j), (k) : Solve according to Example 15 (a).

(c), (d), (g), (h), (l) : Solve according to Example 14 (a).

2. Solve according to Example 16 (a).

3. (a), (c), (e) : Solve according to Example 13 (b).

(b), (d), (f), : Solve according to Example 14 (b).

(g), (h) : Solve according to Example 15 (b).

4. Solve according to Example 16 (b), (c).

5. Solve according to Example 13 (a) or 4 (a).

6. (a) $(3x-4)^2 - (3x+4)^2$

$= (3x)^2 - 2\times 3x\times 4 + 4^2 - [(3x)^2 + 2\times 3x\times 4 + 4^2]$

$= 9x^2 - 24x + 16 - [9x^2 + 24x + 16]$

$= 9x^2 - 24x + 16 - 9x^2 - 24x - 16$

$= 9x^2 - 9x^2 - 24x - 24x + 16 - 16 = -48x$

(b), (c), (d) : Solve according to Q. 6 (a).

M.C.Q.

1. **2. and 3.** Take help of the Answer Sheet.

4. $\left(\frac{-1}{20}x^4 y^3\right) \times (-5x^7 y^2) = \frac{5}{20}x^{11} y^5$

Sum of exponents of terms, 11 + 5 = 16

Degree = 16

5. Take help of the identity II from page no 116.

6. Take help of the Example 7 from page no. 113.

7. Take help of the Example 11 from page 115.

8. Take help of the Example 12 from page 115.

EXERCISE 12.1

1, 2 : Take help of the Answer Sheet.

3, 4 : Study and practise the Examples on page 122 and 123 and then solve.

5. Study the map on page 124 and make the map of your own school accordingly.

EXERCISE 12.2

1. F – E + V = 2

2. Take help of the tables given on page 126 and 127 of the text book.

3. Take help of Example 2.

4. Here $f + v = 7 + 10 = 17$

$e + 2 = 15 + 2 = 17$

$f + v = e + 2$

Thus a polyhedron is possible with 7 faces, 10 vertices and 15 edges.

5. $f + v = e + 2 \Rightarrow f + 20 = 30 + 2 \Rightarrow f + 20 = 32 \Rightarrow 32 - 20 \Rightarrow f = 12$

6. Solve according to Example 5.

7. (a) Three triangle faces cannot make a polyhedron.

(b) Four triangle faces make a triangular pyramid, one triangle as base and three triangles as side faces.

(c) A square face and four triangle faces make a square pyramid with square face as base and four triangles as side faces.

8. When the number of sides of the base of a prism becomes larger and larger, it becomes a cylinder

9. 10, 11 : Take help of the Answer Sheet.

EXERCISE 12.3

1. All the possible cross-sections of a sphere are circles.

2. rectangle

3. (a) no (b) yes (c) no (d) yes

4. (a) Rectangular prism (b) Triangular prism (c) Rectangular pyramid
(d) Triangular pyramid (e) Cylinder (f) Cone

M.C.Q.

1. to 7. : Take help of Answer Sheet.

EXERCISE 13.1

1. Solve according to Example 1.

2. Solve according to Example 2.

3. Solve according to Example 3.

4. Circumference $= 2\pi r = 110$

$$\Rightarrow \quad 2 \times \frac{22}{7} \times r = 110$$

$$\Rightarrow \quad r = \frac{110 \times 7}{2 \times 22} = \frac{35}{2}$$

$$\text{diameter} = 2r = \frac{35}{2} \times 2 = 35\,\text{cm}$$

Now side of the square = diameter of the circle $= 35$ cm

$$\text{Perimeter of the square} = 4 \times 35\,\text{cm} = 140\,\text{cm}$$

5. Perimeter of the rectangle $= 2\,(18\,\text{cm} + 26\,\text{cm}) = 2 \times 44 = 88\,\text{cm}$

Now perimeter, that is, circumference of the circle

$$= \text{perimeter of the rectangle} = 88\,\text{cm}$$

$$2\pi r = 88 \quad \Rightarrow \quad 2 \times \frac{22}{7} \times r = 88$$

$$\Rightarrow \quad tr = \frac{88 \times 7}{2 \times 22} = 14\,\text{cm}$$

$$\text{Area of the circle} = \pi r^2 = \frac{22}{7} \times 14 \times 14 = 616\,\text{cm}^2$$

6. $2\pi r = 440 \quad \Rightarrow \quad = 2 \times \frac{22}{7} \times r = 440$

$$\Rightarrow \quad r = \frac{440 \times 7}{2 \times 22} = 70 \text{ m}$$

Width of the path = 7 m

Radius of the inner circle $= 70\text{ m} - 7\text{ m}$

$= 63\text{ m}$

Area of the path = Area of the whole garden − Area of the inner circle

$$= \frac{22}{7} \times 70 \times 70 - \frac{22}{7} \times 63 \times 63 \text{ m}^2$$

$$= 15400 - 12474 \text{ m}^2$$

$$= 2926 \text{ m}^2$$

7. Area of the square = side × side

$$= 60\text{ m} \times 60\text{ m}$$

$$= 3600 \text{ m}^2$$

By the figure, width of the rectangle = side of the square

$$= 60 \text{ m}$$

Area of the rectangle = length × breadth

$$= 80\text{ m} \times 60\text{ m}$$

$$= 4800 \text{ m}^2$$

Thus, rectangular field has more area.

8. Radius of the semi-circle = 2.8 ÷ 2 = 1.4 cm

Circumference of the semi-circle $= \frac{1}{2} \times 2\pi r$

$$= \pi r = \frac{22}{7} \times 1.4$$

$$= 4.4 \text{ cm}$$

Sum of three line-segments = 1.5 cm + 2.8 cm + 1.5 cm = 5.8 cm

Perimeter of the given shape

= circumference of the semi-circle + sum of the three line-segments

$$= 4.4 \text{ cm} + 5.8 \text{ cm}$$

$$= 10.2 \text{ cm}$$

EXERCISE 13.2

1. Solve according to (a) Example 4 (b) Example 5 (c) Example 6 (d) Example 7.

2. Solve according to Example 4.

3. Area of the trapezium $= \frac{1}{2} h\,(a+b) = \frac{1}{2} \times 4\,(a+10) = 34$

$\Rightarrow \quad 2\,(a+10) = 34 \Rightarrow 2a + 20 = 34$

$\Rightarrow \qquad 2a = 34 - 20 = 14$

$\Rightarrow \qquad a = 14 \div 2 = 7 \text{ cm}$

4. Area of the rhombus $= \frac{1}{2} d_1 \times d_2 = \frac{1}{2} \times 25 \times d_2 = 300$

$\Rightarrow \qquad d_2 = \frac{300 \times 2}{25} = 12 \times 2$

$= 24 \text{ cm}$

5. A rhombus is also a parallelogram.

Area of the rhombus as a parallelogram = base × altitude

$= 8 \times 5 = 40 \text{ cm}^2$

Area of the rhombus $= \frac{1}{2} d_1 \times d_2 = \frac{1}{2} \times 10 \times d_2 = 40$

$\Rightarrow \qquad 5d_2 = 40$

$\Rightarrow \qquad d_2 = 40 \div 5 = 8 \text{ cm}$

6. Solve according to Example 5.

7. Let the smaller parallel side $= x$ cm

Longer parallel side $= (x+4)$ cm

Area of the trapezium $= \frac{1}{2} h\,(a+b) = \frac{1}{2} \times 11 \times (x + x + 4) = 143$

$\Rightarrow \qquad \frac{11}{2}(2x+4) = 143$

$\Rightarrow \qquad 2x + 4 = \frac{143 \times 2}{11} = 13 \times 2 = 26$

$\Rightarrow \qquad 2x = 26 - 4 = 22$

$\Rightarrow \qquad x = 22 \div 2 = 11$

Smaller parallel side $= 11$ cm, Longer parallel side $= 11 + 4 = 15$ cm

8. Area of trapezium $= \frac{1}{2} \times h \times (a+b)$

$$= \frac{1}{2} \times 15(10 + 25)$$

$$= \frac{1}{2} \times 15 \times 35$$

$$= 262.5 m^2$$

Cost of watering = ₹ (262.5 × 4) = ₹ 1050

EXERCISE 13.3

1. Solve according to Example 10.

2. Solve according to Example 11.

M.C.Q.

1. $A = a^2, \quad P = 4a, \quad a = \frac{1}{4} P$

$\therefore \quad P = 36$

$\because \quad A = \left[\frac{1}{4}(36)\right]^2$

$= \frac{1}{16} \times (36)^2$

$= \frac{1}{\cancel{16}_{4}} \times \cancel{36}^{9} \times \cancel{36}^{9} = 81 \text{ cm}^2$

2. $\frac{1}{2} \times 10 \times d_2 = 60$

$\Rightarrow \quad 5d_2 = 60$

$\Rightarrow \quad d_2 = \frac{\cancel{60}^{12}}{\cancel{5}} = 12 \text{ cm}$

3. $\frac{1}{2}(6 + 14) \times h = 60$

$\frac{1}{2}(20) \times h = 60 \quad \Rightarrow \quad 10h = 60 \quad \Rightarrow \quad h = 6$

CD – AD = 14 – 6 = 8

$BC^2 = (8)^2 + (6)^2$

$BC^2 = 64 + 36 = 100$

BC = 10

4. Solve according to Example 10.

5. Area of trapezium $= \frac{1}{2} \times h \times (side_1 + side_2)$

$\Rightarrow \quad 40 = \frac{1}{2} \times h \times (12 + 8)$

$40 = \frac{1}{\cancel{2}} \times h \times (\overset{10}{\cancel{20}})$

$40 = 10h \quad \Rightarrow \quad h = 4$

6. Equilateral triangle is $36 \times \sqrt{3}\,\text{cm}^2$

Equitational triangle $= \frac{\sqrt{3}}{4}(\text{side})^2$

$36 \times \cancel{\sqrt{3}} = \frac{\cancel{\sqrt{3}}}{4}(\text{side})^2$

$36 \times 4 = (\text{side})^2$

$12 \times 12 = (\text{side})^2$

Side = 12 cm

7. L × B = 400

= 2L × 2B = 4 (L × B)

= 4 (400)

8. Solve according to Example 5.

EXERCISE 14.1

1. Volume is required in cubic metre so we convert the length into metres.

$$50\,\text{cm} = \frac{50}{100}\,\text{m}$$

$$= 0.5\,\text{m}$$

Volume of the cubical block $= 0.5\,\text{m} \times 0.5\,\text{m} \times 0.5\,\text{m}$

$$= 0.125\,\text{m}^2$$

Weight of the cubical block of ice $= 0.125 \times 900$ kilograms

$$= 112.500\,\text{kg}$$

$$= 112.5\,\text{kg}$$

2. Solve according to Example 2.

3. Solve according to Example 3.

4. Solve according to Example 4.

5. Volume/capacity of the cylindrical tank $= \pi r^2 h$

$$= \frac{22}{7} \times 1.5 \times 1.5 \times 7\,\text{m}^2 = 49.50\,\text{m}^3$$

$$= 49.50 \times 1000 \text{ litres}$$

$$= 49{,}500 \text{ litres}$$

6. Measures of godown are in metres and measures of boxes are in centimetres. Convert metres into centimetres.

$$\text{Volume of the godown} = 60\,\text{m} \times 40\,\text{m} \times 30\,\text{m}$$

$$= 60 \times 100\,\text{cm} \times 40 \times 100\,\text{cm} \times 30 \times 100\,\text{cm}$$

$$= 6000 \times 4000 \times 3000\,\text{cm}^3$$

$$\text{Volume of one cuboidal box} = 10\,\text{cm} \times 10\,\text{cm} \times 8\,\text{cm}$$

$$= 10 \times 10 \times 8\,\text{cm}^3$$

Number of cuboidal boxes that can be put in the godown

$$= \frac{6000 \times 4000 \times 3000}{10 \times 10 \times 8}$$

$$= 600 \times 500 \times 300$$

$$= 9{,}00{,}00{,}000$$

7. $\text{Volume of the reservoir} = 108\,\text{m}^3 = 108 \times 1000 \text{ litres}$

$$\text{Time taken} = \frac{\text{Volume of the reservoir}}{\text{rate of pouring}} = \frac{108 \times 1000}{60} \text{ minutes}$$

$$= 1800 \text{ minutes} = \frac{1800}{60} \text{ hours} = 30 \text{ hours}$$

8. Solve according to Example 6.

9. Solve according to Example 8.

10. Solve according to Example 9.

11. Solve according to Example 10.

12. Solve according to Example 11.

13. Let the breadth of the room is x metres.

Then the length = thrice $x = 3x$ metres

$\text{Capacity/Volume of the room} = \text{length} \times \text{breadth} \times \text{height} = 60\,\text{m}^3$

$$= 3x \times x \times 5 = 60$$

$\Rightarrow \quad 15x^2 = 60$

$\Rightarrow \quad x^2 = 60 \div 15 = 4 = 2^2 \qquad \Rightarrow \quad x = 2$

breadth $= 2\,\text{m}$, length $= 3 \times 2 = 6\,\text{m}$

14. Solve according to Q. 6.

15. Let the height of the cuboid $= x$ cm

$$\text{Volume of the cuboid} = \text{Volume of the cube}$$

$$20\,\text{cm} \times 10\,\text{cm} \times x\,\text{cm} = 8\,\text{cm} \times 8\,\text{cm} \times 8\,\text{cm}$$

$$x = \frac{8 \times 8 \times 8}{20 \times 10}$$

$$= \frac{256}{100} = 2.56\,\text{cm}$$

EXERCISE 14.2

1. Surface area of the first cuboid $= 2(60 \times 40 + 40 \times 50 + 50 \times 60)$

$$= 2 \times (2400 + 2000 + 3000)$$

$$= 2 \times 7400$$

$$= 14800\,\text{cm}^2$$

Surface area of the second cuboid $= 6l^2 = 6 \times 50 \times 50$

$$= 15000\,\text{cm}^2$$

So, the first cuboid requires lesser amount of material to make.

2. Area of the lateral surface (side faces, front and back faces) $= 2(l + b) \times h$

$$= 2 \times (80 + 30) \times 40\,\text{cm}^2 = 2 \times 110 \times 40 = 8800\,\text{cm}^2$$

Area of the top face $= l \times b = 80 \times 30$

$$= 2400\ \text{cm}^2$$

Total area to be covered with a cloth $= (8800 + 2400)\,\text{cm}^2 = 11200\,\text{cm}^2$

3. Surface arae of the four walls $= 2\,(l + b) \times h$

$$= 2\,(12 + 8) \times 4$$

$$= 2 \times 20 \times 4$$

$$= 160\ \text{m}^2$$

$\therefore$ Cost of whitewashing all walls $= ₹\,(5 \times 160) = ₹\,800$

Area of ceiling $= l \times \text{b} = 12 \times 8 = 96\ \text{m}^2$

Total surface area to be painted $= (160 + 96)\,\text{m}^2$

$$= 256\ \text{m}^2$$

$\therefore$ total cost $= ₹\,(256 \times 5)$

$$= ₹\,1280$$

4. 9 : Solve according to Q. 3.

5. Lateral surface area of a cylinder = circumference of the base × height

$$2\pi r \times 33 = 4224$$

(height of the cylinder becomes width of the sheet)

$$2\pi r = \frac{4224}{33} = \frac{1408}{11} = 128\,\text{cm}$$

Circumference of the base becomes the length of the rectangular sheet

$$= 128\,\text{cm}$$

Perimeter of the rectangular sheet $= 2\,(128\,\text{cm} + 33\,\text{cm})$

$$= 2 \times 161\,\text{cm}$$

$$= 322\,\text{cm}$$

6. $2\pi r(r + h) = 968$

$\Rightarrow \quad 2 \times \frac{22}{7} \times 7\,(7 + h) = 968 \qquad \Rightarrow \quad 7 + h = 968 \div 44$

$\Rightarrow \quad 7 + h = 22 \qquad \Rightarrow \quad h = 22 - 7 = 15\,\text{cm}$

7. Curved surface area of all the pillars

$$= 24 \times (2\pi rh)$$

$$= 24 \times 2 \times \frac{22}{7} \times \frac{28}{100} \times 4\,\text{m}^2$$

$$= 168.96\,\text{m}^2$$

Total cost of painting the curved surface area of all the pillars

$$₹\,8 \times 168.96 = ₹\,1351.68$$

8. Surface area of one cuboidal tin

$$= 2 \times (30 \times 40 + 40 \times 50 + 50 \times 30)$$

$$= 2 \times (1200 + 2000 + 1500) = 2 \times 4700 = 9400\,\text{cm}^2$$

Surface area of 20 such tins $= 20 \times 9400\,\text{cm}^2 = \frac{20 \times 9400}{100 \times 100}\,\text{m}^2 = 18.8\,\text{m}^2$

Cost of the sheet $= ₹\,30 \times 18.8 = ₹\,564$

10. Diameter $= 0.35\,\text{cm}$ radius $= \frac{0.35}{2}\,\text{cm}$

Let h be the length of the cylindrical rod.

Curved surface area $= 2\pi rh = 2 \times \frac{22}{7} \times \frac{0.35}{2} \times h = 132$

$$\Rightarrow \quad h = \frac{132 \times 2 \times 7}{2 \times 22 \times 0.35} = \frac{6}{0.05} = \frac{600}{5} = 120\,\text{cm}$$

Length of the cylindrical rod $= 120\,\text{cm}$

M.C.Q.

1. Required ratio $= \frac{\cancel{6}\times 1\times 1}{\cancel{6}\times 5\times 5} = \frac{1}{25} = 1:25$

2. Each person required 27 m^3 of air

Person can stay in cube room = 8

Area of room = 27 × 8

$= 216 m^3$

Area = $side^3$

Side = $\sqrt[3]{Area}$

$= \sqrt[3]{216}$

= 6 m

3. Volume of water in the cylinder = Volume of water in the cylinder

$= \pi r^2 h$

Volume of half water in the cylinder = $\frac{\text{Volume of water in the cylinder}}{2}$

$= \frac{\pi r^2 h}{2} = \frac{\pi (3)^2 \overset{4}{\cancel{8}}}{\cancel{2}}$

$\Rightarrow \quad = 36\pi cm^3$

4. $a^3 = 729$; a = 9

Surface area = (6 × 9 × 9) = 486 cm^2

5. Let intially the edge of the cube be l

Initial surface area = $6l^2$

If each edge of the cube is doubled, then it becomes $2l$

New surface area = $6\,(2l)^2 = 24l^2 = 4 \times 6l^2$

Clearly, the surface area will be increased by 4 times.

6. A cube has each of its faces as square.

Side of the square = perimeter ÷ 4 = 20 cm ÷ 4 = 5 cm = edge of the cube

Total surface area of the cube $= 6\times (\text{edge})^2 = 6\times (5)^2 = 6\times 25 = 150\,cm^2$

7. Dimension of cuboid are in the ratio 1 : 2 : 3

So, suppose the length, width and height of cuboid are x, 2x and $3x$ respectively.

Then, total surface area of cuboid = 2 ($x \times 3x + 2x \times x + 3x \times 2x$)

$= 2 \times 11x^2 = 22x^2$

And given surface area of cuboid = 88cm^2

So, we have an equation as :

$$22x^2 = 88$$

$$x^2 = \frac{\overset{4}{\cancel{88}}}{\cancel{22}}$$

$$\Rightarrow \quad x = 2$$

So Length of cuboid = 2 cm

Width of cuboid = 2 × 2 = 4 cm

Height of cuboid = 3 × 2 = 6 cm

Therefore, volume of cuboid = 2 × 4 × 6

$$= 48 \text{ cm}^3$$

8. Volume of cylinder A = $\pi r^2 h$

$$9.24 = \pi r^2 (1.5)$$

$$r^2 = \frac{9.24 \times 7}{1.5 \times 22}$$

$$= \frac{64.68}{33}$$

$$\Rightarrow \quad r^2 = 1.96$$

$$r = 1.4$$

EXERCISE 15.1

1. (a) $(-3)^5 = -(-3) \times (-3) \times (-3) \times (-3) \times (-3)$

(b), (c), (d), (e) : Solve according to (a)

2. (a) Same number in multiplied 5 times, so the exponent is 5.

$$\left(\frac{-3}{4}\right) \times \left(\frac{-3}{4}\right) \times \left(\frac{-3}{4}\right) \times \left(\frac{-3}{4}\right) \times \left(\frac{-3}{4}\right) = \left(\frac{-3}{4}\right)^5$$

(b) $\left(\frac{-61}{73}\right) \times \left(\frac{-61}{73}\right) \times \left(\frac{-61}{73}\right) \times \left(\frac{-61}{73}\right) = \left(\frac{-61}{73}\right)^4$

3. (e) $\left(\frac{7}{-9}\right)^3 = \left(\frac{7}{-9}\right) \times \left(\frac{7}{-9}\right) \times \left(\frac{7}{-9}\right) = \frac{7 \times 7 \times 7}{(-9) \times (-9) \times (-9)}$

$$= \frac{343}{-729} = \frac{-343}{729}$$

(a), (b), (c), (d) : Solve according to (e).

4. (a) $-\frac{1}{243} = -\frac{1}{3\times 3\times 3\times 3\times 3} = \left(\frac{-1}{3}\right)^5$

(b), (c), (d), (e) : Solve according to (a).

5. Solve according to Example 3.

6. (a) $\left(\frac{2}{3}\right)^4 \times \left(\frac{-3}{4}\right)^2 \times \left(\frac{3}{5}\right)^2$

$$= \frac{2}{3}\times\frac{2}{3}\times\frac{2}{3}\times\frac{2}{3}\times\frac{(-3)}{4}\times\left(\frac{-3}{4}\right)\times\frac{3}{5}\times\frac{3}{5}$$

$$= \frac{2\times 2\times 2\times 2\times(-3)\times(-3)\times 3\times 3}{3\times 3\times 3\times 3\times 4\times 4\times 5\times 5} = \frac{1}{25}$$

(b) Solve according to (a).

7. (a) $\left[\left(\frac{(-3)}{7}\right)^2\right]^5$

$$= \left(\frac{-3}{7}\right)^{2\times 5} = \left(\frac{-3}{7}\right)^{10}$$

(b) $\left(\frac{-2}{3}\right)^4 \times \left(\frac{-2}{3}\right)^5$

$$= \left(\frac{-2}{3}\right)^{4+5} = \left(\frac{-2}{3}\right)^9$$

(c) Solve according to (b).

(d) $\left(\frac{-5}{7}\right)^5 \div \left(\frac{-5}{7}\right)^2$

$$= \left(\frac{-5}{7}\right)^{5-2} = \left(\frac{-5}{7}\right)^3$$

(e) $\left(\frac{-5}{7}\right)^2 \div \left(\frac{-5}{7}\right)^5$

$$= \frac{1}{\left(\frac{-5}{7}\right)^{5-2}} = \frac{1}{\left(\frac{-5}{7}\right)^3} = \left(\frac{7}{-5}\right)^3$$

(f) $\left(\frac{-3}{5}\right)^4 \div \left(\frac{-7}{10}\right)^4$

$$= \left(\frac{-3}{5} \times \frac{-7}{10}\right)^4 = \left(\frac{21}{50}\right)^4$$

8. (a) $\left[\left(\frac{-1}{2}\right)^3\right]^2$

$$= \left(\frac{-1}{2}\right)^{3\times 2} = \left(\frac{-1}{2}\right)^6 = \frac{(-1)^6}{2^6} = \frac{1}{64}$$

(b) $\left(\frac{6}{7}\right)^3 \div \left(\frac{6}{7}\right)^5$

$$= \frac{1}{\left(\frac{6}{7}\right)^{5-3}} = \frac{1}{\left(\frac{6}{7}\right)^2}$$

$$= \left(\frac{7}{6}\right)^2 = \frac{7\times 7}{6\times 6} = \frac{49}{36}$$

(c), (d) : Apply exponent rule and express as rational numbers.

9. (a) $5^{10} \div 5^8 = \left(\frac{1}{5}\right)^n$

$$5^{10-8} = \left(\frac{1}{5}\right)^n$$

$$5^2 = \left(\frac{1}{5}\right)^n$$

$$\left(\frac{1}{5}\right)^{-2} = \left(\frac{1}{5}\right)^n \quad \Rightarrow \quad n = -2$$

(b) $(-5)^4 \div (-5)^2 = 5^n$

$$(-5)^{4-2} = 5^n$$

$$(-5)^2 = 5^n$$

$$(5)^2 = 5^n$$

$$\Rightarrow \quad n = -2$$

10. $25^n \times \left(\frac{-1}{5}\right)^{2n}$

$$= [(5)^2]^n \times \left(\frac{-1}{5}\right)^{2n}$$

$$= 5^{2n} \times \frac{1}{5^{2n}} = 1$$

EXERCISE 15.2

1. (a) $(3)^{-4} = \left(\frac{1}{3}\right)^4$

$$= \frac{1^4}{3^4} = \frac{1}{3 \times 3 \times 3 \times 3} = \frac{1}{81}$$

(b) $(-2)^{-4} = \left(\frac{1}{-2}\right)^4$

$$= \frac{1^4}{(-2)^4} = \frac{1}{(-2)^4} = \frac{1}{(-2) \times (-2) \times (-2) \times (-2)} = \frac{1}{16}$$

(c) $\left(\frac{1}{3}\right)^{-6} = \left(\frac{3}{1}\right)^6$

$$= 3^6 = 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 729$$

(d) $\left(\frac{1}{2^3}\right)^{-2} = \left(\frac{2^3}{1}\right)^2$

$$= (2^3)^2 = 2^{3 \times 2} = 2^6 = 64$$

(e) $(2)^{-3} \times (-7)^{-1}$

$$= \left(\frac{1}{2}\right)^3 \times \left(\frac{1}{-7}\right)^1 = \frac{1^3}{2^3} \times \frac{1}{-7} = \frac{1}{8} \times \frac{1}{-7} = \frac{1}{-56}$$

2. Solve according to Example 7.

3. Solve according to Example 8.

4. (a) $(3^{-1} \times 5^{-1}) \div 2^{-3}$

$$= \left(\frac{1}{3} \times \frac{1}{5}\right) \div \frac{1}{2^3} = \frac{1}{15} \times 2^3 = \frac{8}{15}$$

(b) $(6^0 + 8^{-1}) \times 3^3 = \left(1 + \frac{1}{8}\right) \times 3 \times 3 \times 3 = \frac{9}{8} \times 27 = \frac{243}{8}$

(c) $\left(\frac{1}{2}\right)^{-2}+\left(\frac{1}{3}\right)^{-2}+\left(\frac{1}{4}\right)^{-2}=\left(\frac{2}{1}\right)^{2}+\left(\frac{3}{1}\right)^{2}+\left(\frac{4}{1}\right)^{2}$

$=\frac{2^2}{1^2}+\frac{3^2}{1^2}+\frac{4^2}{1^2}$

$=4+9+16=29$

(d) $(3^{-1}+4^{-1}+5^{-1})^{0}=1$

When the bracket is powered with 0, its value becomes 1, no need to simplify the inner expression.

(e) Solve according to Example 5.

(f) $\frac{8^{-1}\times 5^3}{2^{-4}}=\frac{\left(\frac{1}{8}\right)^{1}\times 5^3}{\frac{1}{2^4}}$

$=\frac{1}{8}\times 5^3\times\frac{2^4}{1}=\frac{5\times 5\times 5\times 2\times 2\times 2\times 2}{8}$

$=5\times 5\times 5\times 2=250$

5. $3^m\div 3^{-3}=3^5 \quad\Rightarrow\quad 3^{m+3}=3^5 \quad\Rightarrow\quad 3^{m+3}=3^5$

$\Rightarrow m+3=5 \quad\Rightarrow\quad m=5-3 \quad\Rightarrow\quad m=2$

6. (a) $\left[\left(\frac{1}{4}\right)^{-1}-\left(\frac{1}{5}\right)^{-1}\right]^{-1}$

$=\left[\left(\frac{4}{1}\right)^{1}-\left(\frac{5}{1}\right)^{1}\right]^{-1}=[4-5]^{-1}=(-1)^{-1}$

$=\left(\frac{1}{-1}\right)^{1}=\frac{1}{-1}=-1$

(b) $\left(\frac{7}{10}\right)^{-6}\times\left(\frac{10}{7}\right)^{-2}$

$=\left(\frac{7}{10}\right)^{-6}\times\left(\frac{7}{10}\right)^{2}=\left(\frac{7}{10}\right)^{-6+2}=\left(\frac{7}{10}\right)^{-4}=\left(\frac{10}{7}\right)^{4}$

$=\frac{10^4}{7^4}=\frac{10\times 10\times 10\times 10}{7\times 7\times 7\times 7}$

$=\frac{10000}{2401}$

EXERCISE 15.3

1. Take help of the Answer Sheet.

2. Take help of the Answer Sheet.

3. $\dfrac{\text{Diameter of the Sun}}{\text{Diameter of the Earth}}$

$$= \frac{1.4 \times 10^9 \text{ m}}{1.2756 \times 10^7 \text{ m}} = \frac{1.4 \times 10^2 \times 10^7 \text{ m}}{1.2756 \times 10^7 \text{ m}}$$

$$= \frac{1.4 \times 100 \times 10^7 \text{ m}}{1.2756 \times 10^7 \text{ m}} = \frac{140 \times 10^7 \text{ m}}{1.2756 \times 10^7 \text{ m}} = \text{about 100 times}$$

4. $\dfrac{\text{Size of red blood cell}}{\text{Size of a plant cell}} = \dfrac{0.000007 \text{ m}}{0.00001275 \text{ m}}$

$$= \frac{7 \times 10^{-6}}{1.275 \times 10^{-5}} = \frac{7 \times 10^{-6}}{12.75 \times 10^{-6}} = \frac{1}{2} \text{ (approx)}$$

5. Distance between the Moon and the Sun

= Distance between the Earth and the Sun

– Distance between Earth and the Moon

$$= 1.496 \times 10^{11} \text{ m} - 3.84 \times 10^8 \text{ m}$$

$$= 1.496 \times 10^3 \times 10^8 \text{ m} - 3.84 \times 10^8 \text{ m}$$

$$= 1.496 \times 1000 \times 10^8 \text{ m} - 3.84 \times 10^8 \text{ m}$$

$$= 1496 \times 10^8 \text{ m} - 3.84 \times 10^8 \text{ m}$$

$$= (1496 - 3.84) \times 10^8 \text{ m}$$

$$= 1492.16 \times 10^8 \text{ m} = 1.49216 \times 10^{11} \text{ m}$$

M.C.Q.

1. $(-25)^{-2} = \left(\dfrac{1}{-2}\right)^{=2} = \dfrac{1^2}{(-2)^2} = \dfrac{1}{(-2)^2} = \dfrac{1}{(-2)(-2)} = \dfrac{1}{4}$

2. $(2^{-5} \div 2^{-2})$

$$= \frac{1}{2^5} \div \frac{1}{2^2} = \left(\frac{1}{2}\right)^5 \div \left(\frac{1}{2}\right)^2$$

$$= \left(\frac{1}{2}\right)^{5-2} \Rightarrow \left(\frac{1}{2}\right)^3 = \frac{1}{8}$$

3. $(2^{\circ}+4^{-1})\times 2^2$

$\Rightarrow \quad \left(1+\frac{1}{4}\right)\times 2\times 2 \quad \Rightarrow \quad \frac{5}{\cancel{4}}\times\cancel{4}=5$

4. $(4^{-1}+6^{-1}+8^{-1})^0$

$$=\left(\frac{1}{4}+\frac{1}{6}+\frac{1}{8}\right)^0=1$$

5. $\left(\frac{4}{5}\right)^3\times\left(\frac{3}{7}\right)^3$

$$=\left(\frac{4}{5}\right)^3\times\left(\frac{3}{7}\right)^3=\left[\frac{4}{5}\times\frac{3}{7}\right]^3 \quad \Rightarrow \quad \left[\frac{12}{35}\right]^3$$

6. $\left(\frac{4}{11}\right)^{x-1}=\left(\frac{11}{4}\right)^{x-5}$

$$\left(\frac{4}{11}\right)^{x-1}=\left(\frac{4}{11}\right)^{-(x-5)}$$

$$x-1=-(x-5)$$
$$x-1=-x+5$$
$$x+x=5+1$$
$$2x=6 \quad \Rightarrow x=3$$

7. $(2^{3x-1}+10)\div 7=6$

$$=2^{3x-1}+10=6\times 7$$
$$=2^{3x-1}+10=42$$
$$=2^{3x-1}=42-10=32$$
$$=2^{3x-1}=2^5$$
$$=3x-1=5$$
$$\Rightarrow \quad 3x=6$$
$$\Rightarrow \quad x=\frac{\cancel{6}^{2}}{\cancel{3}}=2$$

8. 0.00000000135

$$=\frac{1.35}{10^9}=1.35\times 10^{-9}$$

EXERCISE 16.1

1, 8, 13 and 14 : Solve according to Example 1 and 2.

9, 10 : Solve according to Example 4.

11, 12 : Solve according to Example 3.

EXERCISE 16.2

1, 4 : Solve according to Example 5.

2. Solve according to Example 6.

3. Let x boxes would be filled with 20 bottles in each box.

More bottles in each box, less boxes, so it is a case of inverse proportion.

$$\text{Ratio of boxes} = 25 \text{ boxes} : x \text{ boxes}$$

$$\text{Ratio of bottles} = 12 \text{ bottles} : 20 \text{ bottles}$$

(We take caution to keep order of quantities according to the question.)

$$\text{Ratio of bottles} = \text{Inverse ratio of corresponding number of boxes}$$

$$12 : 20 :: x : 25$$

(To write the unknown first,) the product of the means

$$= \text{the product of extremes}$$

$$20 \times x = 25 \times 12$$

$$x = \frac{25 \times 12}{20} = 15$$

Hence 15 boxes would be filled with 20 bottles in each box.

5, 6 : Solve according to Q. 3.

7, 11 : Solve according to Example 7.

8, 12 : Solve according to Example 8.

9. Solve according to Example 10.

10. A's 1 day's work $= \frac{1}{25}$

B's 1 day's work $= \frac{1}{20}$

A' s and B's 1 day's work $= \frac{1}{25} + \frac{1}{20} = \frac{4+5}{100} = \frac{9}{100}$

A, B and C's 1 day's work $= \frac{1}{8}$

C's 1 day's work $= \frac{1}{8} - \frac{9}{100} = \frac{25-18}{200} = \frac{7}{200}$

So, C alone can finish the whole work in $\frac{200}{7}$ days $= 28\frac{4}{7}$ days

M.C.Q.

1. 8g of Sandal wood cost = ₹40

1g of Sandal wood cost = ₹ $\frac{\cancel{40}}{\cancel{8}} = 5$

Now, 10g of the same type of sandal wood = 5 × 10 = ₹ 50

2. A boy runs 1 km in 10 min.

So, 10 min boy covers 1000 meter

In 1 min boy cover 100 meter.

So, 600 m cover by boy is $= \frac{\cancel{600}}{\cancel{100}} = 6$ min

3. Using concept of man × day = constant

Or $m_1 \times d_1 = m_2 \times d_2$

$18 \times 7 = 6 \times d_2$

$126 = 6d_2$

$\Rightarrow \quad d_2 = \frac{\overset{21}{\cancel{126}}}{\cancel{6}} = 21$ days

4. Solve according Q. 3 above.

5. Solve according Q. 3 above.

6.

a	8	x
b + 2	1.5 + 2	5 + 2
	= 3.5	= 7

$= \frac{\overset{4}{\cancel{8} \times 3.5}}{\cancel{7}\ \cancel{2}} = 4$

7. No. of sheets whose weight 40 gm = 12

No. of sheets whose weight 1 gm $= \frac{12}{40}$

No. of sheets whose weight 1 kg or 1000 gm $= \frac{12}{\cancel{40}} \times \overset{25}{\cancel{1000}}$

$= 12 \times 25$

$= 300$

8. Solve according to Q. 3.

EXERCISE 17.1

1, 2 : Solve according to Example 1 and 2.

3, 4 : Solve according to Example 3 and 4.

EXERCISE 17.2

1. (a), (c), (d), (g), (k), (l) : Solve according to Example 5.

(b), (e), (f), (i), (j), : Solve according to Example 6.

(h) $(x+y)^2 - 4xy$

$= x^2 + y^2 + 2xy - 4xy$

$= x^2 + y^2 - 2xy$

$= (x-y)^2$

2. (a), (b), (c), (h), : Solve according to Example 7.

(d) $(a-b)^2 - c^2$

$= (a-b-c)(a-b+c)$

(e) $a^4 - 81$

$= (a^2)^2 - (9)^2 = (a^2 - 9)(a^2 + 9)$

$= (a^2 - 3^2)(a^2 + 9)$

$= (a-3)(a+3)(a^2 + 9)$

(f) $63a^4 - 112b^4$

$= 7(9a^4 - 16b^4) = 7[(3x^2)^2 - (4b^2)^2]$

$= 7(3x^2 - 4b^2)(3x^2 + 4b^2)$

(g) $(l+\mathrm{m})^2 - (l-\mathrm{m})^2$

$= l^2 + 2l\,\mathrm{m} + \mathrm{m}^2 - (l^2 - 2\,l\,\mathrm{m} + \mathrm{m}^2)$

$= l^2 + 2\,l\mathrm{m} + \mathrm{m}^2 - l^2 + 2l\mathrm{m} - \mathrm{m}^2$

$= 4l\mathrm{m}$

(i) $x^4 - (y-z)^2$

$= (x^2)^2 - (y-z)^2$

$= (x^2 - y + z)(x^2 + y - z)$

3. (a), (b), (d) : Solve according to Example 10.

(c) $x^4 - (x-z)^2$

$$= (x^2)^2 - (x-z)^2$$
$$= (x^2 - x + z)(x^2 + x - z)$$

(e), (f) : Solve according to Example 11.

EXERCISE 17.3

1. Take help of the Answer Sheet.

2. (a), (b), (j) : Solve according to Example 14.

(c), (d) : Solve according to Example 15.

(e), (f), (g), (k) : Solve according to Example 16.

(h), (i), (*l*) : Solve according to Example 20.

EXERCISE 17.4

1. (f) $21a^7b^6 \div (-3a^5b^3) = \dfrac{21a^7b^6}{-3a^5b^3}$

$$= -7a^{7-5}\ b^{6-3}$$
$$= -7a^2\ b^3$$

(a) to (e) : Solve according to (f).

2. Solve according to Example 18.

3, 4 : Solve according to Example 20.

5. Solve according to Example 21.

EXERCISE 17.5

Take help of the Answer Sheet.

M.C.Q.

1. 2. and 3. : Solve according to Example 1 and 2.

4. $ab - a - b + 1$

$$a(b-1) - 1(b-1)$$
$$(a-1)(b-1)$$

5. Solve according to Example 1 and 2.

6. $x^3 - x$

$x(x^2 - 1)$

$(x^2 - 1) = (x+1)(x-1)$ according to $(a^2 - b^2)$

$\Rightarrow\ x(x+1)\ (x-1)$

7. $(x-y)^2-4(x-y)-45$

$$=(x-y)^2-9(x-y)+5(x-y)-45$$
$$=(x-y)[(x-y)-9]+5[(x-y)-9]$$
$$=(x-y)(x-y-9)+5(x-y-9)$$
$$=(x-y)(x-y-9)+5(x-y-9)$$
$$=(x-y+5)\ (x-y-9)$$

8. $5x^2+17x+6$

$$=5x^2+15x+2x+6$$
$$=5x(x+3)+2(x+3)$$
$$=(5x+2)\ (x+3)$$

EXERCISE 18.1

1. Solve according to Example 2.

2. Solve according to Example 1.

3. Solve according to Example 3.

4, 5 : Take help of the Answer Sheet.

EXERCISE 18.2

1, 2, 3, 4 : Solve according to Example 4, 5, 6.

5, 6 : Solve according to Example 7.

M.C.Q.

Take help of the Answer Sheet.

EXERCISE 19.1

1, 2 : Take help of the Answer Sheet.

3. (a), (b), (c) : Solve each according to Example 1 and 2 separately.
(d), (e) : Solve according to Example 3.

4. Take help of the Answer Sheet.

EXERCISE 19.2

1. Solve according to Example 8.

2. Solve according to Example 9.

3. Solve according to (i) Example 11 (ii) Example 10.

4. Solve according to Example 13.

5, 6 : Solve according to Example 12.

7. Solve according to example 11.

EXERCISE 19.3

1.

1	12	11
14	10	6
9	8	13

2.

31	3	5	25
9	21	19	15
17	13	11	23
7	27	29	1

3. (a)

6	1	8
7	5	3
2	9	4

(b)

2	7	6
9	5	1
4	3	8

(c)

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

M.C.Q.

Take help of the Answer Sheet.

□