Miscellaneous Problems : Set 2

EXERCISE [PAGE 100]

Exercise | Q 1 | Page 100

Angela deposited 15000 rupees in a bank at a rate of 9 p.c.p.a. She got simple interest amounting to 5400 rupees. For how many years had she deposited the amount?

Solution: Amount deposited = Rs 15000

Rate of interest = 9%

Simple interest = Rs 5400

Let the number of years be n.

$$SI = \frac{PRT}{100}$$

$$\Rightarrow 5400 = \frac{15000 \times 9 \times n}{100}$$

$$\Rightarrow \frac{5400 \times 100}{15000 \times 9} = n$$

⇒ n = 4

Thus, the number of years for which she had deposited the money is 4 years.

Exercise | Q 2 | Page 100

Ten men take 4 days to complete the task of tarring a road. How many days would 8 men take?

Solution:

Number of men	Number of days
10	4
8	x

More the men lesser the number of days required to finish the work.
So, the number of men and the number of days required to complete the work are inversely proportional to each other.

$$\frac{10}{8} = \frac{x}{4}$$

$$\Rightarrow x = \frac{10 \times 4}{8}$$

⇒ x = 5

Thus, when 8 men are involved so, 5 days will be required.

Exercise | Q 3 | Page 100

Nasruddin and Mahesh invested Rs 40,000 and Rs 60,000 respectively to start a business. They made a profit of 30%. How much profit did each of them make?

Solution: Nasruddin invested Rs 40,000

Mahesh invested Rs 60,000

Profit = 30%

Profit earned by Nasruddin = 30% of Rs. 40000

$$= \frac{30}{100} \times 40000 = 12000$$

Profit earned by Mahesh = 30% of Rs. 60000

$$= \frac{30}{100} \times 60000 = 18000$$

Thus, Nasruddin got Rs 12,000 profit and Mahesh earned Rs 18,000 as profit.

Exercise | Q 4 | Page 100

The diameter of a circle is 5.6 cm. Find its circumference.

Solution: Diameter = 5.6 cm

$$\text{Radius} = \frac{\text{diameter}}{2} = \frac{5.6}{2} = 2.8 \text{ cm}$$

$$\text{Circumference} = 2\pi r = 2 \times \frac{22}{7} \times 2.8 = 17.6 \text{ cm}'$$

Thus, the circumference of the circle is 17.6 cm.

Exercise | Q 5.1 | Page 100

Expand: $(2a - 3b)^2$

Solution: $(2a - 3b)^2$

Using the identity $(x - y)^2 = x^2 - 2xy + y^2$

$(2a - 3b)^2 = (2a)^2 - 2 \times 2a \times (3b)^2$

$= 4a^2 - 12ab + 9b^2$

Exercise | Q 5.2 | Page 100

Expand: $(10 + y)^2$

Solution: $(10 + y)^2$

Using the identity $(a + b)^2 = a^2 + 2ab + b^2$

$= (10)^2 + 2 \times 10 \times y + (y)^2$

$= 100 + 20y + y^2$

Exercise | Q 5.3 | Page 100

Expand: $\left(\frac{p}{3} + \frac{q}{4}\right)^2$

Solution:

$$\left(\frac{p}{3} + \frac{q}{4}\right)^2$$

Using the identity $(a + b)^2 = a^2 + 2ab + b^2$

$$= \left(\frac{p}{3}\right)^2 + 2 \times \frac{p}{3} \times \frac{q}{4} + \left(\frac{q}{4}\right)^2$$

$$= \frac{p^2}{9} + \frac{pq}{6} + \frac{q^2}{16}$$

Exercise | Q 5.4 | Page 100

Expand: $\left(y - \frac{3}{y}\right)^2$

Solution:

$$\left(y-\frac{3}{y}\right)^2$$

Using the identity $(a - b)^2 = a^2 - 2ab + b^2$

$$= y^2 - 2 \times y \times \frac{3}{y} + \left(\frac{3}{y}\right)^2$$

$$= y^2 - 6 + \frac{9}{y^2}$$

Exercise | Q 6.1 | Page 100

Use a formula to multiply of (x - 5)(x + 5).

Solution: We use the formula: $(x - a)(x + a) = x^2 - a^2$

(x – 5)(x + 5)

$(x^2 - 5^2) = x^2 - 25$

Exercise | Q 6.2 | Page 100

Use a formula to multiply of (2a – 13)(2a + 13)

Solution: We use the formula: $(x - a)(x + a) = x^2 - a^2$

(2a – 13)(2a + 13)

$= (2a)^2 - 13^2$

$= 4a^2 - 169$

Exercise | Q 6.3 | Page 100

Use a formula to multiply of (4z – 5y)(4z + 5y)

Solution: We use the formula: $(x - a)(x + a) = x^2 - a^2$

(4z – 5y)(4z + 5y)

$= (4z)^2 - (5y)^2$

$= 16z^2 - 25y^2$

Exercise | Q 6.4 | Page 100

Use a formula to multiply of (2t – 5)(2t + 5)

Solution: We use the formula: $(x - a)(x + a) = x^2 - a^2$

$(2t – 5)(2t + 5)$

$= (2t)^2 - (5)^2$

$= 4t^2 - 25$

Exercise | Q 7 | Page 100

The diameter of the wheel of a cart is 1.05 m. How much distance will the cart cover in 1000 rotations of the wheel?

Solution: Diameter = 1.05 m

$$= 2 \times \frac{22}{7} \times \left(\frac{1.05}{2}\right) = 3.3 \text{ m}$$

In 1000 rotations, the distance covered = 3.3 m × 1000 = 3300 m = 3.3 km

Exercise | Q 8 | Page 100

The area of a rectangular garden of length 40 m, is 1000 sqm. Find the breadth of the garden and its perimeter. The garden is to be enclosed by 3 rounds of fencing, leaving an entrance of 4 m. Find the cost of fencing the garden at a rate of 250 rupees per metre.

Solution: Length of the garden = 40 m

Area = 1000 sq m

$\Rightarrow lb = 1000$

$\Rightarrow 40b = 1000$

$\Rightarrow b = 25$ m

Perimeter = $2 (l + b) = 2 (40 + 25) = 130$ m

For 1 round of fencing leaving the entrance of 4 m, the length of wire required = 130 m - 4 m = 126 m

For 3 such rounds of fencing, 3 × 126 m = 378 m of wire required.

Rate of fencing 1 m = Rs 250

Rate of fencing 378 m = 378 × 250 = Rs. 94500

Thus, Rs 94500 is required for fencing the garden.

Exercise | Q 10 | Page 100

If the edge of a cube is 8 cm long, find its total surface area.

Solution: Edge of the cube = 8 cm

Total surface area = $6a^2 = 6 \times (8)^2 = 384\ cm^2$

Thus, the total surface area of the cube is $384\ cm^2$

Exercise | Q 11 | Page 100

Factorise: $365y^4z^3 – 146y^2z^4$

Solution: $365y^4z^3 – 146y^2z^4$

Taking $73y^2z^3$ common,

$= 73y^2z^3 (5y^2 - 2z)$

MULTIPLE CHOICE QUESTIONS [PAGE 100]

Multiple choice Questions | Q 1 | Page 100

Choose the right answers from the option:

If the average of the numbers 33, 34, 35, x , 37, 38, 39 is 36, what is the value of x?

1. 40
2. 32
3. 42
4. **36**

Solution: Average = 36

$$\Rightarrow \frac{33 + 34 + 35 + x + 37 + 38 + 39}{7} = 36$$

$$\Rightarrow \frac{216 + x}{7} = 36$$

$$\Rightarrow 216 + x = 252$$

$\Rightarrow x = 36$

Multiple choice Questions | Q 3 | Page 100

Choose the right answers from the option.

If 2600 rupees are divided between Sameer and Smita in the proportion 8 : 5, the share of each is _____ and _____ respectively.

1. Rs 1500, Rs 1100
2. Rs 1300, Rs 900
3. Rs 800, Rs 500
4. **Rs 1600, Rs 1000**

Solution: Rs 2600 are divided among Sameer and Smita.

Ratio = 8 : 5

Total = 8 + 5 = 13

$$\text{Sameer's share} = \frac{8}{13} \times 2600 = 1600$$

$$\text{Smita's share} = \frac{5}{13} \times 2600 = 1000$$

Thus, Sameer's share is Rs 1600 and Smita's share is Rs 1000.