Exercise 10D

Question 40:
Let the breadth of a rectangle = x meter
Then, length of rectangle = 3x meter

$$\therefore \text{Area} = \text{length} \times \text{breadth} = 147\text{cm}^2$$

$$\Rightarrow x \times 3x = 147 \Rightarrow 3x^2 = 147 \Rightarrow x^2 = 49$$

$$x = \sqrt{49} \Rightarrow x = \pm 7$$

$$\Rightarrow x = 7 \quad \text{or} \quad x = -7$$

$$\therefore \quad x = 7 \left[\because \text{breadth cannot be negative}\right]$$

Thus, breadth of rectangle = 7 m
And length of rectangle = (3 × 7)m = 21 m

Question 41:
Let the breadth of hall = x meters
Then, length of the hall = (x + 3) meters
Area = length × breadth = 238 m^2

$$x \times (x + 3) = 238 \Rightarrow x^2 + 3x - 238 = 0$$

$$\Rightarrow x^2 + 17x - 14x - 238 = 0$$

$$\Rightarrow x(x + 17) - 14(x + 17) = 0$$

$$\Rightarrow (x + 17)(x - 14) = 0$$

$$\Rightarrow x = -17 \quad \text{or} \quad x = 14$$

$$x = 14 \left[\because \text{Breadth cannot be negative}\right]$$

Thus, the breadth of hall is 14 cm
And length of the hall is (14 + 3) = 17 cm

Question 42:
Let the breadth of the rectangular plot be x meter
Then, Perimeter = 2(length + breadth) = 62 m
⇒ length + breadth = 31m
⇒ length = (31 - x) meters
Area = (31 - x)x sq. meter

$$\text{Now,} \quad (31 - x) \times x = 228 \Rightarrow x^2 - 31x + 228 = 0$$

$$\Rightarrow x^2 - 19x - 12x - 228 = 0$$

$$\Rightarrow x(x - 19) - 12(x - 19) = 0$$

$$\Rightarrow (x - 19)(x - 12) = 0$$

$$x = 19 \quad \text{or} \quad x = 12$$

Hence the length and breadth of rectangle is 19 m and 12 m.

Question 43:
Let the side of square be x cm
Then, length of the rectangle = 3x cm
Breadth of the rectangle = (x - 4) cm
Area of rectangle = Area of square x

$$\therefore 3x(x-4) = x^2 \Rightarrow 3x^2 - 12x = x^2$$

$$\Rightarrow 2x^2 - 12x = 0$$

$$\Rightarrow 2x(x-6) = 0$$

$$\Rightarrow 2x = 0 \quad \text{or} \quad x - 6 = 0$$

$$x = 0 \quad \text{or} \quad x = 6$$

$$\Rightarrow x = 6 \ (\text{Side of the square is never } 0)$$

Thus, side of the square = 6 cm
And length of the rectangle = (3 × 6) = 18 cm
Then, breadth of the rectangle = (6 - 4) cm = 2 cm

Question 44:
Let the length = x meter
Area = length × breadth = 180 m^2

$$\text{Breadth} = \left(\frac{180}{x}\right)\text{m}$$

$$\therefore x + \frac{180}{x} + \frac{180}{x} = 39$$

$$\Rightarrow x^2 - 39x + 360 = 0$$

$$\Rightarrow x^2 - 24x - 15x + 360 = 0$$

$$\Rightarrow x(x-24) - 15(x-24) = 0$$

$$\Rightarrow (x-24)(x-15) = 0$$

$$\Rightarrow x = 24 \quad \text{or} \quad x = 15$$

If ength of the rectangle = 15 m

$$\text{Then, Breadth} = \left(\frac{180}{15}\right)\text{m} = 12\text{m}$$

Also, if length of rectangle = 24 m

$$\therefore \text{Breadth} = \frac{181}{24}\text{m} = \frac{15}{2}\text{m} = 7.5\text{ m}$$

********** END **********