

≥ CHAPTER 4 ≤

QUADRATIC EQUATIONS

⇒ IMPORTANT QUESTION & SOLUTION ⇐

Q. Solve the quadratic equation :

$$x^2 - 5x + 6 = 0$$

Sol.

$$x^2 - 5x + 6 = 0$$

[Splitting the middle term]

$$x^2 - 2x - 3x + 6 = 0$$

[Taking common]

$$x(x - 2) - 3(x - 2) = 0$$

[Taking $(x - 2)$ common]

$$(x - 2)(x - 3) = 0$$

[Product of two factors is zero]

$$x - 2 = 0 \quad \text{or} \quad x - 3 = 0$$

$$x = 2 \quad \text{or} \quad x = 3$$



Hence, the solutions are $x = 2, 3$

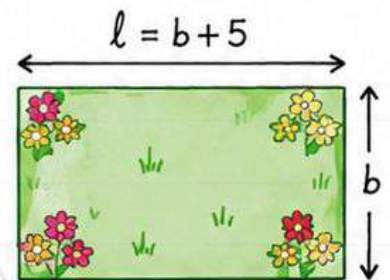


CHAPTER 4

QUADRATIC EQUATIONS

IMPORTANT QUESTION & SOLUTION

Q. The length of a rectangular garden is 5 m more than its breadth. If the area of the garden is 84 m^2 , find the length and breadth of the garden.



Sol.

Let the breadth of the garden be b m.

Then, length = $(b + 5)$ m

Area of the rectangular garden = length $\times$ breadth

$$(b + 5) \times b = 84$$

$$b^2 + 5b = 84$$

$$b^2 + 5b - 84 = 0$$

[Transferring 84 to L.H.S.]

[Factorizing the quadratic equation]

$$b^2 + 12b - 7b - 84 = 0$$

$$b(b + 12) - 7(b + 12) = 0$$

$$(b + 12)(b - 7) = 0$$

$$\text{Either } b + 12 = 0 \quad \text{or} \quad b - 7 = 0$$

$$b = -12 \text{ (Not possible)} \\ \text{(Breadth cannot be negative)}$$

$$b = 7 \text{ m}$$

So, the breadth = 7 m

$$\text{Length} = b + 5 = 7 + 5 = 12 \text{ m}$$



Hence, the length of the garden is 12 m
and the breadth is 7 m.

Mathangles

QUADRATIC EQUATIONS

IMPORTANT QUESTION & SOLUTIONS



- Q.1** A train travels 360 km at a certain average speed. If the speed had been 5 km/h more, it would have taken 1 hour less. Find the speed of the train.



Sol. Let the original speed of the train be x km/h.

- Time taken at speed $x = \frac{360}{x}$ hours
- Time taken at speed $(x+5) = \frac{360}{x+5}$ hours
- According to the question,

$$\frac{360}{x+5} = \frac{360}{x} - 1$$

1 hour less

$$\frac{360}{x+5} = \frac{360-x}{x}$$

$$360x = (360-x)(x+5)$$

$$360x = 360x + 1800 - x^2 - 5x$$

$$x^2 + 5x - 1800 = 0$$

Divide by 5: $x^2 + x - 360 = 0$ (Simplified)

Factorizing: $x^2 + 20x - 18x - 360 = 0$

$$x(x+20) - 18(x+20) = 0$$

$$(x+20)(x-18) = 0$$

Either $x+20=0$ or $x-18=0$

$$x = -20 \quad \times$$

(Not possible)

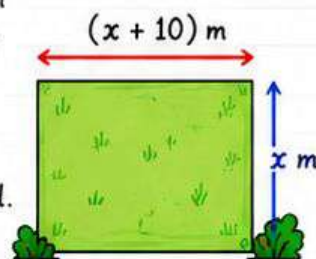
$$x = 18 \quad \checkmark$$



Hence, the speed of the train is 18 km/h.



- Q.2** A rectangular field is 10 m longer than it is wide. If the area of the field is 360 m^2 , find the length and the breadth of the field.

**Sol.**

Let the breadth (width) of the field be x m.

Then, length = $x + 10$ m

- Area of rectangle = length $\times$ breadth
- According to the question,

$$x(x+10) = 360 \quad [\text{Area} = 360 \text{ m}^2]$$

$$x^2 + 10x - 360 = 0 \quad [\text{Quadratic equation}]$$

Factorizing: $x^2 + 24x - 14x - 360 = 0$

$$x(x+24) - 14(x+24) = 0$$

$$(x+24)(x-15) = 0$$

Either $x+24=0$ or $x-15=0$

$$x = -24 \quad \times$$

(Not possible)

$$x = 15 \quad \checkmark$$

So,

★ Breadth (x) = 15 m

★ Length = $x + 10 = 15 + 10 = 25$ m



Hence, the length of the field is 25 m and the breadth is 15 m.

