

CLASS - X
MATHEMATICS

Quadratic Equation

1. For what value of m , the equation $(m - 3)x^2 + 7x - 9 = 0$ will not be quadratic?

Ans.: If $m - 3 = 0$ i.e., $m = 3$ then the given equation will not be quadratic.

2. Find the condition for which the roots of the equation $ax^2 + bx + c = 0$ ($a \neq 0$) are reciprocal of one another and opposite in sign.

Ans.: Since the roots of $ax^2 + bx + c = 0$ are reciprocal of one another and opposite in sign, we have the product of roots is -1 .

But from the given equation we have, the product of roots is $= \frac{c}{a}$.

$$\therefore \frac{c}{a} = -1 \Rightarrow c = -a \Rightarrow c + a = 0$$

\therefore The required condition is $\boxed{c + a = 0}$

3. For what value of K , the roots of the equation $2x^2 + 3x + K = 0$ are real and equal?

Ans.: We know that the roots of $ax^2 + bx + c = 0$ are real and equal if $b^2 = 4ac$.

As the roots of $2x^2 + 3x + K = 0$ are real and equal we have $(3)^2 = 4 \cdot 2 \cdot K \Rightarrow 9 = 8K \Rightarrow K = \frac{9}{8}$

\therefore The value of K is $\frac{9}{8}$.

4. If α and β are the roots of the equation $5x^2 + 2x - 3 = 0$ then find the value of $\left(\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}\right)$.

Ans.: α and β are the roots of $5x^2 + 2x - 3 = 0$

$$\therefore \alpha + \beta = -\frac{2}{5} \text{ and } \therefore \alpha\beta = -\frac{3}{5}$$

$$\therefore \frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha} = \frac{\alpha^3 + \beta^3}{\alpha\beta} = \frac{(\alpha + \beta)^3 - 3\alpha\beta(\alpha + \beta)}{\alpha\beta} = \frac{\left(\frac{-2}{5}\right)^3 - 3\left(\frac{-3}{5}\right)\left(\frac{-2}{5}\right)}{\frac{-3}{5}}$$

$$= \frac{-\frac{8}{125} - \frac{18}{25}}{\frac{-3}{5}} = \frac{-\frac{8-90}{125}}{\frac{-3}{5}} = \frac{-\frac{98}{125}}{\frac{-3}{5}}$$

$$= \left(-\frac{98}{125}\right) \times \left(-\frac{5}{3}\right) = \frac{98}{75}$$

5. If the five times of a positive whole number is 3 less than twice the square of the number then find the number.

Ans.: Let the positive whole number be x .

$$\therefore \text{ According to the given problem, } 2x^2 - 3 = 5x$$

$$\Rightarrow 2x^2 - 5x - 3 = 0 \Rightarrow 2x^2 - 6x + x - 3 = 0$$

$$\Rightarrow 2x(x - 3) + 1(x - 3) = 0 \Rightarrow (x - 3)(2x + 1) = 0$$

$$\Rightarrow \text{ Either } x - 3 = 0 \text{ or } 2x + 1 = 0$$

$$\Rightarrow x = 3 \text{ or } x = -\frac{1}{2}$$

Since x is a positive whole number, $x \neq -\frac{1}{2}$.

\therefore we get $x = 3$.

The required positive number is 3.