

Quadratic Equations

Question1

If AM and GM of roots of a quadratic equation are 5 and 4 , respectively, then the quadratic equation is

KCET 2024

Options:

A. $x^2 - 10x - 16 = 0$

B. $x^2 + 10x + 16 = 0$

C. $x^2 + 10x - 16 = 0$

D. $x^2 - 10x + 16 = 0$

Answer: D

Solution:

Let a and b be the roots the quadratic equation.

Then, the quadratic equation is

$$x^2 - (a + b)x + ab = 0 \quad \dots (i)$$

It is given that $AM = 5$ and $GM = 4$

i.e. $\frac{a+b}{2} = 5$ and $\sqrt{ab} = 4$

$$\Rightarrow a + b = 10 \text{ and } ab = 16$$

On substituting these values in Eq. (i), we obtain. Hence, $x^2 - 10x + 16 = 0$ is the required equation.



Question2

Given that a, b and x are real numbers and $a < b, x < 0$, then

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Options:

A. $\frac{a}{x} \geq \frac{b}{x}$

B. $\frac{a}{x} < \frac{b}{x}$

C. $\frac{a}{x} \leq \frac{b}{x}$

D. $\frac{a}{x} > \frac{b}{x}$

Answer: D

Solution:

Given, $a < b$

Dividing the above in equation by " x "

$$\Rightarrow \frac{a}{x} > \frac{b}{x} \quad [\because x < 0]$$

[Sign of inequality changes when its both sides are divided by a negative number]

Question3

If α and β are roots of the equation $x^2 = x + 1 = 0$, then $\alpha^2 + \beta^2$ is

KCET 2019

Options:

A. $\frac{-1-i\sqrt{3}}{2}$

B. 1

C. -1



D. $\frac{-1+i\sqrt{3}}{2}$

Answer: C

Solution:

Given the equation $x^2 - x + 1 = 0$, let's find $\alpha^2 + \beta^2$ where α and β are the roots.

First, we know:

$$\alpha + \beta = -1 \quad \text{and} \quad \alpha\beta = 1$$

Now, we use the identity for the sum of squares of the roots:

$$\alpha^2 + \beta^2 = (\alpha + \beta)^2 - 2\alpha\beta$$

Substituting the known values:

$$\alpha^2 + \beta^2 = (-1)^2 - 2(1) = 1 - 2 = -1$$

Thus, $\alpha^2 + \beta^2$ is -1 .

