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RISE UP अॅकॅडमी

इयत्ता : 5 वी ते 10 वी

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Class: 10 English / Semi-English (State) Subject : Algebra Total Marks: 40

Date: Time:

10th Algebra 40 Marks

Q.1) A) Choose the correct alternative for the following questions [04]

1) Which of the following is a quadratic equation?

a) $5/x - 3 = x^2$ b) $x(x + 5) = 2$ c) $n - 1 = 2n$ d) $\frac{1}{x^2}(x + 2) = x$

2) The roots of $x^2 + kx + k = 0$are real and unequal, find k

a) 0 b) 4 c) 0 or 4 d) 2

3) Which of the following quadratic equation has roots 3, 5?

a) $x^2 - 15x + 8 = 0$ b) $x^2 - 8x + 15 = 0$ c) $x^2 + 3x + 5 = 0$ d) $3x^2 + 8x - 15 = 0$

4) If $\alpha = -7$ and $\beta = -3$ the quadratic equation is -----

a) $x^2 - 10x - 21 = 0$ b) $x^2 + 10x + 21 = 0$ c) $x^2 - 10x + 21 = 0$ d) $x^2 + 10x - 21 = 0$

Q.1) B) Solve the following questions [04]

1) Find the value of discriminant : $\sqrt{2}x^2 + 4x + 2\sqrt{2} = 0$

2) Decide given equation is quadratic equation or not : $m^3 + 3m^2 - 2 = 3m^2$

3) Write the given equation in the form of $ax^2 + bx + c = 0$, then write the values of a, b, c : $(x - 1)^2 = 2x + 3$

4) If sum of the roots of quadratic equation is 10 and product is 9, then form the quadratic equation.

Q.2) A) Complete any two activities [04]

1) If $\alpha = -5$ and $\beta = 9$, then form the quadratic equation,

Solution: The required quadratic equation is, $x^2 + (\square+\square)x + \square \times \square = 0$ $\therefore x^2 - \square x - \square = 0$

2) Form a quadratic equation : I am a quadratic equation , My standard form is [----------]

My roots are 3 and 4. $\therefore$ sum of my roots = $\square$ and product of my roots = $\square$ $\therefore$ my equation is [----------]

3) One of the roots of quadratic equation $5m^2+2m+k=0$ is $\frac{7}{5}$. Complete the following activity to find the value of k

-7/5 is a root of quadratic equation $5m^2+2m+k=0$ Put m = $\square$ in the equation, $\therefore$ $5\times(-7/5)^2+2\square+k=0$ $\therefore \square+(-14/5)+k=0$ $\implies \therefore k=\square$

Q.2) B) Solve any Four sub questions [08]

1) Solve the quadratic equation by factorization : $2x^2 - 2x + \frac{1}{2} = 0$

2) Form the quadratic equation from the roots given : $\frac{1}{2}$ and $-\frac{1}{2}$

3) Solve the quadratic equation by factorization : $x^2 + 8x + 15 = 0$

4) Determine whether the values given against each of the quadratic equation are the roots of the equation : $x^2 + 4x - 5 = 0$, $x = 1, -1$

5) Find k if $x = 3$ is a root of equation $kx^2 - 10x + 3 = 0$

Q.3) A) Complete any One activity [03]

1) Solve the following quadratic equation by completing square method

$x^2 + 9x + 18 = 0$

If $x^2 + 9x + k = (x + a)^2$. Then, $x^2 + 9x + k = x^2 + 2ax + a^2$

$\therefore a = \square$, $k = a^2 = \square$, Now, $x^2 + 9x + 18 = 0$

$\therefore (x + \square)^2 - \left(\frac{81-72}{4}\right) = 0 \quad \Rightarrow \quad (x + \square)^2 - \left(\frac{3}{2}\right)^2 = 0$

$\therefore x = \square$ or $x = \square$

2) If α and β are the roots of quadratic equation $x^2 + 5x - 1 = 0$ then find: i) $\alpha^3 + \beta^3$ ii) $\alpha^2 + \beta^2$

Solution: $x^2 + 5x - 1 = 0$; Here, $a = 1, b = 5, c = -1$

$$\alpha + \beta = \frac{-\square}{\square} = -\square \text{ and } \alpha \times \beta = \frac{\square}{\square} = \square$$

$$\alpha^3 + \beta^3 = (\alpha + \beta)^3 - 3\alpha\beta(\alpha + \beta) = \square^3 - 3\square\square = \square$$

$$\alpha^2 + \beta^2 = \square^2 - 2\square = \square$$

Q.3) B) Solve any Two sub questions [06]

1) Solve the quadratic equation : $\frac{1}{x+5} = \frac{1}{x^2}$

2) Solve the quadratic equation by factorization method : $(2x+3)^2 = 25$

3) Product of Pragati's age 2 years ago and three years hence is 84. Find her present age.

4) Sum of the roots of a quadratic equation is double their product. Find k if equation is $x^2 - 4kx + k + 3 = 0$

Q.4) Solve any Two sub questions [08]

1) The product of four consecutive positive integers is 840. Find the numbers.

2) Pintu takes 6 days more than those of Nishu to complete certain work. If they work together, they finish it in 4 days. How many days would it take to complete the work if they work alone?

3) A rectangular playground is 420 sq m. If its length is increased by 7 m and breadth is decreased by 5 meters. The area remains the same. Find the length and breadth of playground.

Q.5) Solve any One sub question [03]

1) Solve the following quadratic equation by formula method : $25x^2 + 30x + 9 = 0$

2) The difference between the roots of the equation $x^2 - 13x + k = 0$ is 7 find k.