Previous Year Questions 2024

Q1: What should be added from the polynomial $x^2 - 5x + 4$, so that 3 is the zero of the resulting polynomial? (2024)

(a) 1

(b) 2

(c) 4

(d) 5

Ans: (b)

Let, $f(x) = x^2 - 5x + 4$

Let p should be added to f(x) then 3 becomes zero of polynomial.

So, $f(3) + p = 0$

$\Rightarrow 3^2 - 5 \times 3 + 4 + p = 0$

$\Rightarrow 9 + 4 - 15 + p = 0$

$\Rightarrow -2 + p = 0$

$\Rightarrow p = 2$

So, 2 should be added.

Q2: Find the zeroes of the quadratic polynomial $x^2 - 15$ and verify the relationship between the zeroes and the coefficients of the polynomial. (2024)

Ans:

$x^2 - 15 = 0$

$x^2 = 15$

$x = \pm\sqrt{15}$

Zeroes will be $\alpha = \sqrt{15}$, $\beta = -\sqrt{15}$

Verification: Given polynomial is $x^2 - 15$

On comparing above polynomial with

$ax^2 + bx + c$, we have

$a = 1, b = 0, c = -15$

sum of zeros $= \alpha + \beta$

$= \sqrt{15} - \sqrt{15} = \frac{0}{1} = \frac{-b}{a}$

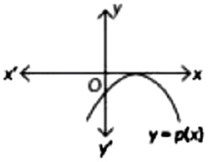
Product of zeros $= \alpha\beta$

$\sqrt{15} \times -(\sqrt{15}) = \frac{-15}{1} = \frac{c}{a}$

Hence, verified.

Previous Year Questions 2023

Q3: The graph of y = p(x) is given, for a polynomial p(x). The number of zeroes of p(x) from the graph is (2023)



(a) 3

(b) 1

(c) 2

(d) 0

Ans: (b)

Here, y = p(x) touches the x-axis at one point

So, number of zeros is one.

Q4: If α, β are the zeroes of a polynomial $p(x) = x^2 + x - 1$, then 1/α + 1/β equals to (2023)

(a) 1

(b) 2

(c) -1

(d) -1/2

Ans: (a)

The polynomial is $\mathbf{p(x) = x^2 + x - 1}$.

Step 1: The relationships between the zeroes and coefficients:

Sum of zeroes (**α + β**): $-\frac{b}{a} = -\frac{1}{1} = -1$

Product of zeroes (**αβ**): $\frac{c}{a} = \frac{-1}{1} = -1$

Step 2: Simplify $\frac{1}{\alpha} + \frac{1}{\beta}$:

$$\frac{1}{\alpha} + \frac{1}{\beta} = \frac{\alpha + \beta}{\alpha\beta}$$

Substitute the values:

$$\frac{\alpha + \beta}{\alpha\beta} = \frac{-1}{-1} = 1$$

Final Answer: (a) 1

Q5: If α, β are the zeroes of a polynomial $p(x) = x^2 - 1$, then the value of (α + β) is (2023)

(a) 1

(b) 2

(c) -1

(d) 0

Ans: (d)

The polynomial is $p(x) = x^2 - 1$.

Step 1: Sum of zeroes (**α + β**): $-\frac{b}{a} = -\frac{0}{1}$

Step 2: Simplify:

$$-\frac{0}{1} = 0$$

Final Answer: (d) 0

Q6: If α, β are the zeroes of a polynomial $p(x) = 4x^2 - 3x - 7$, then (1/α + 1/β) is equal to (2023)

(a) 7/3

(b) -7/3

(c) 3/7

(d) -3/7

Ans: (d)

The polynomial is $p(x) = 4x^2 - 3x - 7$.

Step 1: calculating sum and product of zeroes

Sum of zeroes (**α + β**): $-\frac{b}{a} = -\frac{(-3)}{4} = \frac{3}{4}$

Product of zeroes (**αβ**): $\frac{c}{a} = \frac{-7}{4}$

Step 2: Simplify $\frac{1}{\alpha} + \frac{1}{\beta}$:

$$\frac{\alpha + \beta}{\alpha\beta} = \frac{\frac{3}{4}}{\frac{-7}{4}} = \frac{-3}{7}$$

Final Answer: (d) $-\frac{3}{7}$

Q7: If one zero of the polynomial $p(x) = 6x^2 + 37x - (k - 2)$ is reciprocal of the other, then find the value of k. (CBSE 2023)

Ans: We have,

The polynomial is $\mathbf{p(x) = 6x^2 + 37x - (k - 2)}$.

Step 1: The relationship between the product of zeroes and coefficients:

Product of zeroes (**αβ**): $\frac{c}{a} = \frac{-(k-2)}{6}$

It is given that **αβ = 1**. Substitute this:

$$\frac{-(k-2)}{6} = 1$$

Step 2: Solve for **k**:

Multiply both sides by 6:

$-(k - 2) = 6$

Simplify:

$k - 2 = -6$

$k = -4$

Final Answer: k = - 4

Previous Year Questions 2022

Q8: If one of the zeroes of a quadratic polynomial $(k - 1)x^2 + kx + 1$ is - 3, then the value of k is (2022)

(a) 4/3

(b) -4/3

(c) 2/3

(d) -2/3

Ans: (a)

Given, -3 is a zero of quadratic polynomial $(k - 1)^2 + kx + 1$.

$\therefore (k - 1)(-3)^2 + k(-3) + 1 = 0$

$\Rightarrow 9k - 9 - 3k + 1 = 0 \Rightarrow 6k - 8 = 0$

$\Rightarrow k = 8/6$

$\Rightarrow k = 4/3$

Q9: If the path traced by the car has zeroes at -1 and 2, then it is given by (2022)

(a) $x^2 + x + 2$

(b) $x^2 - x + 2$

(c) $x^2 - x - 2$

(d) $x^2 + x - 2$

Ans: (c)

The zeroes of the polynomial are **-1** and **2**.

Step 1: The polynomial with given zeroes is:

$p(x) = a(x - \alpha)(x - \beta)$

Substitute the zeroes **$\alpha = -1$** and **$\beta = 2$**:

$p(x) = a(x - (-1))(x - 2) = p(x) = a(x + 1)(x - 2)$

Step 2: Expand the polynomial:

$p(x) = a[(x)(x) + (x)(-2) + (1)(x) + (1)(-2)]$

$p(x) = a[x^2 - x - 2]$

Step 3: Assuming **$a = 1$**:

$p(x) = x^2 - x - 2$

Final Answer: (c) $x^2 - x - 2$

Q10: The number of zeroes of the polynomial representing the whole curve, is (2022)

(a) 4

(b) 3

(c) 2

(d) 1

Ans: (a)

Given curve cuts the x-axis at four distinct points.

So, number of zeroes will be 4 .

Q11: The distance between C and G is (2022)

(a) 4 units

(b) 6 units

(c) 8 units

(d) 7 units

Ans: (b)

Q12: The quadratic polynomial, the sum of whose zeroes is -5 and their product is 6. (2022)

(a) $x^2 + 5x + 6$

(b) $x^2 - 5x + 6$

(c) $x^2 - 5x - 6$

(d) $-x^2 + 5x + 6$

Ans: (a)

Let α, β be the zeroes of required polynomial p(x).

Given, $\alpha + \beta = -5$ and $\alpha.\beta = 6$

$\therefore p(x) = k[x^2 - (-5)x + 6] = k[x^2 + 5x + 6]$

Thus, one of the polynomial which satisfy the given condition is $x^2 + 5x + 6$

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Previous Year Questions 2021

Q13: If one zero of the quadratic polynomial $x^2 + 3x + k$ is 2 then find the value of k. (2021)

Ans: Given, polynomial is $f(x) = x^2 + 3x + k$

Since, 2 is zero of the polynomial f(x).

$\therefore f(2) = 0$

$\Rightarrow f(2) = (2)^2 + 3 \times 2 + k$

$\Rightarrow 4 + 6 + k = 0$

$\Rightarrow k = -10$

Previous Year Questions 2020

Q14: The degree of polynomial having zeroes -3 and 4 only is (2020)

(a) 2

(b) 1

(c) more than 3

(d) 3

Ans: (a)

Since, the polynomial has two zeroes only. So. the degree of the polynomial is 2.

Q15: If one of the zeroes of the quadratic polynomial $x^2 + 3x + k$ is 2. then the value of k is (2020)

(a) 10

(b) - 10

(c) -7

(d) -2

Ans: (b)

Given, 2 is a zero of the polynomial

$p(x) = x^2 + 3x + k$

$\therefore p(2) = 0$

$\Rightarrow (2)^2 + 3(2) + k = 0$

$\Rightarrow 4 + 6 + k = 0 =$

$\Rightarrow 10 + k = 0$

$\Rightarrow k = -10$

Q16: The quadratic polynomial, the sum of whose zeroes is -5 and their product is 6______ is (2020)

(a) $x^2 + 5x + 6$

(b) $x^2 - 5x + 6$

(c) $x^2 - 5x - 6$

(d) $-x^2 + 5x + 6$

Ans: (a)

Let α, β be the zeroes of required polynomial p(x)

Given, $\alpha + \beta = -5$ and $\alpha\beta = 6$

$p(x) = k[x^2 - (-5)x + 6]$

$= k[x^2 + 5x + 6]$

Thus, one of the polynomial which satisfy the given condition is $x^2 + 5x + 6$.

Q17: Form a quadratic polynomial, the sum and product of whose zeroes are (-3) and 2 respectively. (CBSE 2020)

Ans: Let α, β be the zeroes of required polynomial Given, $\alpha + \beta = -3$ and $\alpha\beta = 2$

$\therefore p(x) = k[x^2 = -(-3)x + 2] = k(x^2 + 3x + 2)$

For k = 1 , $p(x) = x^2 + 3x + 2$

Hence, one of the polynomial which satisfy the given condition is $x^2 + 3x + 2$.

Q18: The zeroes of the polynomial $x^2 - 3x - m(m + 3)$ are:

(a) m, m + 3

(b) −m, m + 3

(c) m, − (m + 3)

(d) −m, − (m + 3) (CBSE 2020)

Ans: (b)

Given:

$x^2 - 3x - m(m + 3) = 0$

Let's find the zeroes by applying the quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Substitute into the formula:

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4 \cdot 1 \cdot (-m(m+3))}}{2 \cdot 1}$$

$$x = \frac{3 \pm \sqrt{9 + 4m(m+3)}}{2}$$

Simplify under the square root:

$$x = \frac{3 \pm \sqrt{9 + 4m^2 + 12m}}{2}$$

$$x = \frac{3 \pm \sqrt{(2m+3)^2}}{2}$$

Taking the square root:

$$x = \frac{3 \pm (2m+3)}{2}$$

So, the zeroes are −m and m + 3.

Thus, the correct answer is (b) −m, m + 3.

Previous Year Questions 2019

Q19: Find the value of k such that the polynomial $x^2 - (k + 6)x + 2(2k - 1)$ has sum of its zeroes equal to half of their product. [Year 2019, 3 Marks]

Ans: 7

The given polynomial is $x^2 -(k + 6)x + 2(2k - 1)$

According to the question

Sum of zeroes = 1/2(Product of Zeroes):

⇒ k + 6 = 1/2 x 2 (2k - 1)

⇒ k + 6 = 2k - 1

⇒ k = 7