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(Affiliated to CBSE up to +2 Level)

CLASS: X

SUB.: MATHS (NCERT BASED)

DATE: 25-04-2021

1. Find the zeroes of the polynomial $f(x) = x^2 + 7x + 12$ and verify the relation between its zeroes and coefficients. Sol: $x^2 + 7x + 12 = 0$

$$\Rightarrow x^2 + 4x + 3x + 12 = 0$$

$$\Rightarrow x(x+4) + 3(x+4) = 0$$

$$\Rightarrow (x+4)(x+3) = 0$$

$$\Rightarrow (x+4) = 0 \text{ or } (x+3) = 0$$

$$\Rightarrow x = -4 \text{ or } x = -3$$

Sum of zeroes = $-4 + (-3) = -7/1 = -(\text{coefficient of } x) / (\text{coefficient of } x^2)$

Product of zeroes = $(-4) \times (-3) = 12/1 = \text{constant term} / (\text{coefficient of } x^2)$

Solve these questions

1. Find the zeroes of the polynomial $f(x) = x^2 - 2x - 8$ and verify the relation between its zeroes and coefficients.
2. Find the zeroes of the quadratic polynomial $f(x) = x^2 + 3x - 10$ and verify the relation between its zeroes and coefficients
3. Find the zeroes of the quadratic polynomial $f(x) = 4x^2 - 4x - 3$ and verify the relation between its zeroes and coefficients.
4. Find the zeroes of the quadratic polynomial $f(x) = 5x^2 - 4 - 8x$ and verify the relationship between the zeroes and coefficients of the given polynomial
5. Find the zeroes of the polynomial $f(x) = 2\sqrt{3}x^2 - 5x + \sqrt{3}$ and verify the relation between its zeroes and coefficients.

2. Find a quadratic polynomial each with the given numbers as the sum and product of its zeroes respectively.

(i) $1/4, -1$

Solution: From the formulas of sum and product of zeroes, we know,

$$\text{Sum of zeroes} = \alpha + \beta = 1/4$$

$$\text{Product of zeroes} = \alpha \beta = -1$$

∴ If α and β are zeroes of any quadratic polynomial, then the quadratic polynomial can be written directly as:-

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

$$x^2 - (1/4)x + (-1)$$

$$4x^2 - x - 4 = 0$$

Thus, $4x^2 - x - 4$ is the quadratic polynomial.

Solve these questions

(ii) $\sqrt{2}, 1/3$

(iii) $0, \sqrt{5}$

(iv) $1, 1$

(v) $-1/4, 1/4$

(vi) $4, 1$