

# Mathematics

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## Polynomials (Assignment - 1)

(Class - X)

### (Level - 1)

1. In a graph of  $y = p(x)$ , find the number of zeroes of  $p(x)$ .

Ans. 3.

2. If  $\alpha, \beta$  are the zeroes of  $f(x) = x^2 + x + 1$ , then find  $\frac{1}{\alpha} + \frac{1}{\beta}$ .

Ans. (-1)

3. Find a quadratic polynomial whose zeroes are  $\frac{-2}{\sqrt{3}}$  and  $\frac{\sqrt{3}}{4}$ .

$$\text{Ans. } x^2 - \left(\frac{-2}{\sqrt{3}} + \frac{\sqrt{3}}{4}\right)x + \left(-\frac{1}{2}\right)$$

4. If  $p(x) = \frac{1}{3}x^2 - 5x + \frac{3}{2}$  then find its sum and product of zeroes.

Ans. Sum=15, Product =9/2

5. If the sum of zeroes of a given polynomial  $f(x) = x^3 - 3kx^2 - x + 30$  is 6. Find the value of K.

$$\text{Ans. } \alpha + \beta + \gamma = \frac{-b}{a} = \frac{3k}{1} = 6$$

k = 2

6. Find the zero of polynomial  $3x + 4$ .

Ans. -4/3

7. Write the degree of zero polynomial.  
Ans. Not defined.

### (Level - 2)

1. Form a cubic polynomial with zeroes 3, 2 and -1.

$$\text{Hints/Ans. } p(x) = x^3 - (\alpha + \beta + \gamma)x^2 + (\alpha\beta + \beta\gamma + \gamma\alpha)x - \alpha\beta\gamma$$

2. Find the zeroes of the quadratic polynomial  $6x^2 - 3 - 7x$  and verify the relationship between the zeroes and the coefficients.

Ans. Zeroes are 3/2 & -1/3.

3. For what value of k, (-4) is a zero of polynomial  $x^2 - x - (2k + 2)$ ?

Ans. k=9

4. Give an example of polynomials

$p(x), g(x), q(x)$  and  $r(x)$  which satisfy division algorithm and  $\text{deg. } p(x) = \text{deg. } g(x)$ .

$$\text{Ans. } 3x^2 + 2x + 1, x^2, 3, 2x + 1$$

5. Find the zeroes of  $4u^2 + 8u$ .

Ans. 0, -2

6. Find a quadratic polynomial, whose the sum and product of its zeroes are  $\frac{1}{4}, -1$ .

$$\text{Ans. } x^2 - \frac{1}{4}x - 1$$

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## ( Level - 3 )

1. Find the zeroes of polynomial  $x^3 - 2x^2 - x + 2$   
Ans. -1, 1, 2
2. If the zeroes of the polynomial  $x^3 - 3x^2 + x + 1$  are  $\alpha - \beta$ ,  $\alpha$ ,  $\alpha + \beta$ . Find  $\alpha$  and  $\beta$   
Ans.  $\alpha = 1$ ,  $\beta = \pm\sqrt{2}$
3. Divide  $f(x) = 6x^3 + 11x^2 - 39x - 65$  by  $g(x) = x^2 - 1 + x$   
Ans. Quotient= $6x + 5$ ; Remainder =  $-38x - 60$
4. Check whether the polynomial  $t^2 - 3$  is a factor of polynomial  $2t^4 + 3t^3 - 2t^2 - 9t - 12$   
by applying the division algorithm.  
Ans. Remainder=0, Quotient= $2t^2 + 3t + 4$ , Given Polynomial is a factor.

## ( Level - 4 )

1. Obtain all zeroes of  $f(x) = x^3 + 13x^2 + 32x + 20$   
Ans. -1, -2, -10
2. Obtain all other zeroes of  $3x^4 + 6x^3 - 2x^2 - 10x - 5$ , if two of its zeroes are  $\sqrt{\frac{5}{3}}$  and  $-\sqrt{\frac{5}{3}}$   
Ans. -1 & -1
3. On dividing  $x^3 - 3x^2 + x + 2$  by a polynomial  $g(x)$ , the quotient and remainder were  $x - 2$  and  $-2x + 4$  respectively, find  $g(x)$ .  
Ans.  $x^2 - x + 1$

## (PROBLEMS FOR SELF-EVALUATION)

1. Check whether  $g(x) = 3x - 2$  is a factor of  $p(x) = 3x^3 + x^2 - 20x + 12$ .
2. Find quotient and remainder applying the division algorithm on dividing  $p(x) = x^3 - 6x^2 + 2x - 4$  by  $g(x) = x - 1$ .
3. Find zeros of the polynomial  $2x^2 - 8x + 6$
4. Find the quadratic polynomial whose sum and product of its zeros are  $\frac{2}{3}$ ,  $\frac{-1}{3}$  respectively.
5. Find the zeroes of polynomial  $x^3 - 2x^2 - x + 2$
6. If one of the zeroes of the polynomial  $2x^2 + px + 4 = 0$  is 2, find the other root, also find the value of p.
7. If  $\alpha$  and  $\beta$  are the zeroes of the polynomial  $kx^2 + 4x + 4$  show that  $\alpha^2 + \beta^2 = 24$ , find the value of k.
8. If  $\alpha$  and  $\beta$  are the zeroes of the equation  $6x^2 + x - 2 = 0$ , find  $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$