B.B.S.S Sec School
CLASS-X
Sub- Maths
Ch-2- Polynomials

Polynomial:- An algebraic expression of the form

$P(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \dots + a_1 x + a_n$.

(where n is a positive integer and $a_0, a_1, a_2, \dots a_{n-1}, a_n$ are real numbers) is called a polynomial in variable x.

for example: $2x+3$, $2x^2-5x+4$, $y^4+3y^3+4y^2+5+9$ ... etc.

Quadratic Polynomial:-

A polynomial of degree 2 is called quadratic polynomial its general form is ax^2+bx+c $(a \neq 0)$.

for example: x^2+3x+5, $5x^2-6x$, $6x^2+5$ ... etc.

Zeros of a polynomial:-

A real number a is called zero of a polynomial $P(x)$ if $P(a) = 0$.

Relation between the zeros and coefficients of a quadratic polynomial:

If α and β are the zeros of the quadratic polynomial ax^2+bx+c then.

(i) Sum of zeros $(\alpha+\beta) = \frac{-\text{Coeff. of } x}{\text{Coeff. of } x^2} = \frac{-b}{a}$

(ii) Product of zeros $(\alpha\beta) = \frac{\text{constant term}}{\text{Coeff. of } x^2} = \frac{c}{a}$.

(iii) To form a quadratic polynomial:.

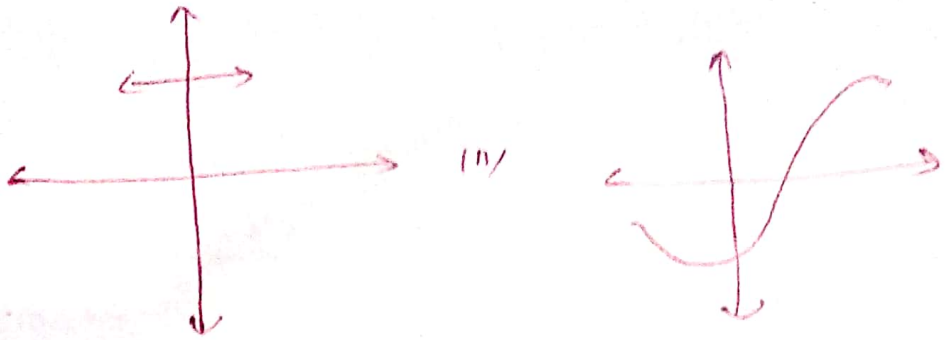
If α, β are the zeros of a quadratic polynomial then polynomial $P(x) = k[x^2-(\alpha+\beta)x+\alpha\beta]$

where k is any constant,

The polynomial can also be written as without constant $x^2-(\alpha+\beta)x+\alpha\beta$.

PTO

Ex 2.1 Q1 A)



Ans (i) No. zeroes
∵ Graph do not intersect the x-axis.

(ii) one zero,
∵ Graph intersect the x-axis at only one point

Ex. 2.2. (i) $x^2 - 2x - 8$

$x^2 - 4x + 2x - 8$

$x(x-4) + 2(x-4)$

$(x+2)(x-4)$

for zeros

$x+2=0, \quad x-4=0$

$x = -2, \quad x = 4$

Sum of zeros $(\alpha+b) = \frac{-b}{a}$

$-2+4 = \frac{-(-2)}{1}$

$2 = 2$

Product of zeros $= \frac{c}{a}$

$\alpha \times \beta = \frac{c}{a}$

$-2 \times 4 = \frac{-8}{1}$

$-8 = -8$

(iv) $4u^2 + 8u$

$\Rightarrow 4u(u+2)$

for zeros

$4u = 0, \quad u+2 = 0$

$u = \frac{0}{4} \quad u = -2$

$\Rightarrow u = 0, -2$

$\alpha = 0, \quad \beta = -2$

Sum of zeros $= \frac{-b}{a}$

$0 + (-2) = \frac{-8}{4}$

$-2 = -2$ LHS = RHS

Product of zeros $= \frac{c}{a}$

$\alpha \times \beta = \frac{c}{a}$

$0 \times -2 = \frac{0}{4}$

$0 = 0$

LHS = RHS

P.T.O

Ex. 2.2

Q.2 (i) (1) $\frac{1}{4}, -1$

Here sum of zeros $(\alpha+\beta) = \frac{1}{4} = -\frac{b}{a}$

product of zeros $(\alpha\beta) = \frac{c}{a} = \frac{-1}{1}$

$\frac{c}{a} = \frac{-1\times4}{1\times4} = \frac{-4}{4}$

on comparing we get

$a=4, \quad b=-1, \quad c=-4$

Let the quadratic polynomial is ax^2+bx+c

put $a=4, \quad b=-1, \quad c=-4$

$4x^2-x-4$ is the required polynomial. Ans

Homework:- Ex 2.1 → Q 3 to 6.

Ex 2.2 ⇒ Q 1. (ii) (iii) (v) (vi)

Q 2. (ii) to (vi)

Assignment:-

Q1 Find zeros and verify the relationship between the zeros and coefficients.

(i) $5x^2-8x-4$ (ii) $2x^2-5x+3$ (iii) $5y^2-10y$

(iv) $4\sqrt{3}x^2+5x-2\sqrt{3}$

Q.2 Find the quadratic polynomial each with the given numbers as sum and product of zeros resp.

(i) 3, −28 (ii) $-1, \frac{-3}{4}$ (iii) $\frac{7}{6}, \frac{1}{3}$ (iv) $0, -\frac{3}{5}$