DAY 2

In last section, we discussed the relationship of zeroes and coefficients of quadratic polynomial
In this section, we form a polynomial if zeroes are given:

If α & β are zeroes of a quadratic polynomial then quadratic polynomial

$$\boldsymbol{p(x) = (x-\alpha)(x-\beta) = x^2 - (\alpha+\beta)x + \alpha\beta = x^2 - Sx + P}$$

$$\boldsymbol{where\ S = Sum\ of\ zeroes = \alpha+\beta \ \ \&\ \ P = Product\ of\ zeroes = \alpha\beta}$$

1. Form a quadratic polynomial whose zeroes are as follows:

(i) $3, 1$ (ii) $-5, 2$ (iii) $-2, -3$ (iv) $5, \sqrt{3}$ (v) $4, -1$

Sol:- (**i**) Given zeroes = 3,1

$\therefore$ S = sum of zeroes $= 3 + 1 = 4$ and P = product of zeroes $= 3 \times 1 = 3$

Given polynomial= $x^2 - Sx + P = x^2 - 4x + 3$

(**ii**) Given zeroes = $-5, 2$

$\therefore$ S = sum of zeroes $= -5 + 2 = -3$ and P = product of zeroes $= -5 \times 2 = -10$

Given polynomial= $x^2 - Sx + P = x^2 - (-3)x + (-10) = x^2 + 3x - 10$

(**iii**) Given zeroes = $-2, -3$

$\therefore$ S = sum of zeroes $= -2 + (-3) = -5$ and P = product of zeroes $= (-2) \times (-3) = 6$

Given polynomial= $x^2 - Sx + P = x^2 - (-5)x + 6 = x^2 + 5x + 6$

(**iv**) Given zeroes = $5, \sqrt{3}$

$\therefore$ S = sum of zeroes $= 5 + \sqrt{3}$ and P = product of zeroes $= 5 \times \sqrt{3} = 5\sqrt{3}$

Given polynomial= $x^2 - Sx + P = x^2 - \left(5 + \sqrt{3}\right)x + 5\sqrt{3}$

(**v**) Given zeroes = $4, -1$

$\therefore$ S = sum of zeroes $= 4 + (-1) = 4 - 1 = 3$ and P = product of zeroes $= 4 \times (-1) = -4$

Given polynomial= $x^2 - Sx + P = x^2 - 3x + (-4) = x^2 - 3x - 4$

2. Form a quadratic polynomial whose sum of zeroes and product of zeroes are as follows:

(**i**) $3, -4$ (**ii**) $\frac{1}{2}, \frac{1}{3}$ (**iii**) $\sqrt{3}, 4$ (**iv**) $-2, -5$ (**v**) $\frac{-2}{3}, 1$

Sol:- (**i**) Given sum of zeroes(S) $= 3$ and product of zeroes(P) $= -4$

Given polynomial= $x^2 - Sx + P = x^2 - 3x + (-4) = x^2 - 3x - 4$

(**ii**) Given sum of zeroes(S) $= \frac{1}{2}$ and product of zeroes (P) $= \frac{1}{3}$

Given polynomial= $x^2 - Sx + P = x^2 - \frac{1}{2}x + \frac{1}{3}$

(**iii**) Given sum of zeroes(S) $= \sqrt{3}$ and product of zeroes (P) $= 4$

Given polynomial= $x^2 - Sx + P = x^2 - \sqrt{3}x + 4$

(**iv**) Given sum of zeroes(S) $= -2$ and product of zeroes (P) $= -5$

Given polynomial= $x^2 - Sx + P = x^2 - (-2)x + (-5) = x^2 + 2x - 5$

(**v**) Given sum of zeroes(S) $= \frac{-2}{3}$ and product of zeroes (P) $= 1$

Given polynomial$= x^2 - Sx + P = x^2 - \left(\frac{-2}{3}\right)x + 1 = x^2 + \frac{2}{3}x + 1$

3. **Find the zeroes of a polynomial $x^2 - 17x + 60$ and verify the relation between zeros and coefficients.**

Sol:. $p(x) = x^2 - 17x + 60 = x^2 - 12x - 5x + 60$

$= x(x-12) - 5(x-12) = (x-12)(x-5)$

So zeroes of polynomial $p(x)$ are

If $x - 12 = 0$ and $x - 5 = 0$ $i.e.$ $x = 12, x = 5$

Verification

Zeroes of polynomial $x^2 - 17x + 60$ are 12& 5

Sum of zeroes $= 12 + 5 = 17 = \frac{-\mathrm{b}}{\mathrm{a}}$

Product of zeroes $= 12 \times 5 = 60 = \frac{\mathrm{c}}{\mathrm{a}}$

EXERCISE

1. Form a quadratic polynomial whose zeroes are as follows:

   (i) 4,3 (ii) $-2, -5$ (iii) $-6{,}3$ (iv) $3, \sqrt{2}$ (v) $4, -4$

2. Ex 2.2, Q 2