

Chapter 02

POLYNOMIALS

Example:

Find the values of the constants 'a' and 'b', if $(x-2)$ and $(x+3)$ are both factors of the expression $(x^3 + ax^2 + bx - 12)$.

Solution:

Let $P(x) = x^3 + ax^2 + bx - 12$

$\therefore (x-2)$ is a factor of $P(x)$

$$\Rightarrow P(2) = 0$$

$$\Rightarrow (2)^3 + a(2)^2 + b(2) - 12 = 0$$

$$\Rightarrow (-3)^2 + a(-3)^2 + b(-3) - 12 = 0$$

$$\Rightarrow 4a + 2b = 4$$

$$\Rightarrow 2a + b = 2 \rightarrow (1)$$

$\therefore (x+3)$ is a factor of $P(x)$

$$\Rightarrow P(-3) = 0$$

$$\Rightarrow 9a - 3b = 39$$

$$\Rightarrow 3a - b = 13 \rightarrow (2)$$

Add (1) & (2) we get,

$$5a = 15$$

$$\Rightarrow a = \frac{15}{5} = 3$$

$$\Rightarrow \boxed{a = 3}$$

Substitute 'a' in equation(1),

$$2(3) + b = 2$$

$$\Rightarrow 6 + b = 2$$

$$\Rightarrow b = 2 - 6 = -4$$

$$\Rightarrow \boxed{b = -4}$$

Hence, $\boxed{a = 3}$ and $\boxed{b = -4}$.