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CS21BTECH11010

Question: : 3(a) : If $(x+2)$ and $(x+3)$ are factors of x^3+ax+b, find the values of $'a'$ and $'b'$.

Solution: According to the question :
$x+2$ and $x+3$ are factors of x^3+ax+b.
Then, -2 and -3 are solutions of the equation

$$x^3+ax+b=0 \tag{1}$$

On substituting $x=-2$ int the equation (1)

$$\implies (-2)^3+a(-2)+b=0$$
$$\implies 2a-b=-8$$

The value of b in terms of a is :

$$b=2a+8 \tag{2}$$

On substituting $x=-3$ in the equation (1)

$$\implies (-3)^3+a(-3)+b=0$$
$$\implies 3a-b=-27 \tag{3}$$

On substituting equation (2) in equation (3)

$$\implies 3a-(2a+8)=-27$$
$$\implies a-8=-27$$
$$\implies a=-19$$

Substitute value of a in equation (2)

$$\implies b=2(-19)+8$$
$$\implies b=-30$$

$\therefore$ The value of $a=-19$ and value of $b=-30$.

Using values of a and b, equation (1) can be re-written as :

$$x^3-19x-30=0 \tag{4}$$

This can be verified by plotting the graph of the equation

$$y=x^3-19x-30 \tag{5}$$

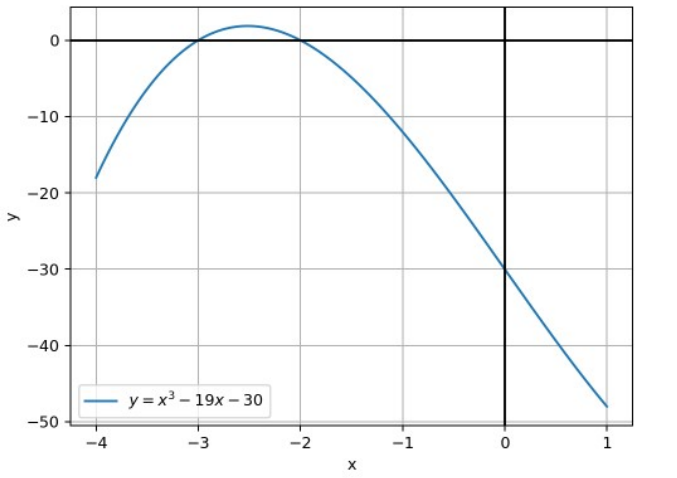

Fig. 1. Graph of equation (5) intersects X-axis at $x=-3$ and $x=-2$