

**ASSIGNMENT 1 : QUESTION 11**  
**(A)**

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Therefore  $k = -2$

Substituting the value of  $k$ , we get

$$2k - 9 = -13$$

$$5k + 24 = 14$$

Given:

- $f(x) = x^3 + (kx + 8)x + k$
- Sum of remainders of  $f(x)$  after dividing by  $(x + 1)$  and  $(x - 2)$  is 1

Therefore, the remainders are :

$$f(x) \mod (x + 1) = -13$$

$$f(x) \mod (x - 2) = 14$$

Find:

- Remainders of  $f(x)$  after dividing by  $(x + 1)$  and  $(x - 2)$
- The value of  $k$

**Solution :**

By the remainder theorem,

The remainder after dividing a polynomial  $p(x)$  by  $(x - r)$  is equal to  $p(r)$ .

Therefore,

$$f(x) \mod (x + 1) = f(-1)$$

$$f(x) \mod (x - 2) = f(2)$$

$$\begin{aligned} f(-1) &= (-1)^3 + (k(-1) + 8) * (-1) + k \\ &= -1 + k - 8 + k \\ &= \underline{2k - 9} \end{aligned}$$

$$\begin{aligned} f(2) &= 2^3 + (2k + 8) \cdot 2 + k \\ &= 8 + 4k + 16 + k \\ &= \underline{5k + 24} \end{aligned}$$

Given that  $(2k - 9) + (5k + 24) = 1$

Rearranging, we get  $7k = -14$