



### Factorisation of Polynomials Ex 6.3 Q10

**Answer :**

Let us denote the given polynomials as

$$f(x) = ax^3 + 3x^2 - 3,$$

$$g(x) = 2x^3 - 5x + a,$$

$$h(x) = x - 4$$

Now, we will find the remainders  $R_1$  and  $R_2$  when  $f(x)$  and  $g(x)$  respectively are divided by  $h(x)$ .

By the remainder theorem, when  $f(x)$  is divided by  $h(x)$  the remainder is

$$R_1 = f(4)$$

$$= a(4)^3 + 3(4)^2 - 3$$

$$= 64a + 48 - 3$$

$$= 64a + 45$$

By the remainder theorem, when  $g(x)$  is divided by  $h(x)$  the remainder is

$$R_2 = g(4)$$

$$= 2(4)^3 - 5(4) + a$$

$$= 128 - 20 + a$$

$$= a + 108$$

(i) By the given condition,

$$R_1 = R_2$$

$$\Rightarrow 64a + 45 = a + 108$$

$$\Rightarrow 64a - a = 108 - 45$$

$$\Rightarrow 63a = 63$$

$$\Rightarrow a = \frac{63}{63}$$

$$\Rightarrow a = \boxed{1}$$

(ii) By the given condition,

$$R_1 + R_2 = 0$$

$$\Rightarrow 64a + 45 + a + 108 = 0$$

$$\Rightarrow 65a + 153 = 0$$

$$\Rightarrow 65a = -153$$

$$\Rightarrow a = \boxed{-\frac{153}{65}}$$

(iii) By the given condition,

$$2R_1 - R_2 = 0$$

$$\Rightarrow 2(64a + 45) - (a + 108) = 0$$

$$\Rightarrow 128a + 90 - a - 108 = 0$$

$$\Rightarrow 127a = 18$$

$$\Rightarrow a = \boxed{\frac{18}{127}}$$

**Answer :**

Let us denote the given polynomials as

$$f(x) = ax^3 + 3x^2 - 13,$$

$$g(x) = 2x^3 - 5x + a,$$

$$h(x) = x - 2$$

Now, we will find the remainders  $R_1$  and  $R_2$  when  $f(x)$  and  $g(x)$  respectively are divided by  $h(x)$ .

By the remainder theorem, when  $f(x)$  is divided by  $h(x)$  the remainder is

$$\begin{aligned} R_1 &= f(2) \\ &= a(2)^3 + 3(2)^2 - 13 \\ &= 8a + 12 - 13 \\ &= 8a - 1 \end{aligned}$$

By the remainder theorem, when  $g(x)$  is divided by  $h(x)$  the remainder is

$$\begin{aligned} R_2 &= g(2) \\ &= 2(2)^3 - 5(2) + a \\ &= 16 - 10 + a \\ &= a + 6 \end{aligned}$$

By the given condition, the two remainders are same. Then we have,  $R_1 = R_2$

$$\Rightarrow 8a - 1 = a + 6$$

$$\Rightarrow 8a - a = 6 + 1$$

$$\Rightarrow 7a = 7$$

$$\Rightarrow a = \frac{7}{7}$$

$$\Rightarrow a = \boxed{1}$$

\*\*\*\*\* END \*\*\*\*\*