

# Mathematics

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(Chapter – 2) (Polynomials)(Exemplar Problems)  
(Class – IX)

## Exercise 2.4

### Question 3:

If both  $x - 2$  and  $x - \frac{1}{2}$  are factors of  $px^2 + 5x + r$ , show that  $p = r$ .

### Answer 3:

Given polynomials:

$$f(x) = px^2 + 5x + r$$

Since,  $x - 2$  is factors of  $f(x)$

Using factor theorem,

When  $f(x)$  is divided by  $x - 2$ , the remainder is zero.

$$f(2) = p(2)^2 + 5(2) + r$$

$$\Rightarrow 0 = 4p + 10 + r$$

$$\Rightarrow 4p + r = -10 \quad \dots \text{(i)}$$

Since,  $x - \frac{1}{2}$  is factors of  $f(x)$

Using factor theorem,

When  $f(x)$  is divided by  $x - \frac{1}{2}$ , the remainder is zero.

$$f\left(\frac{1}{2}\right) = p\left(\frac{1}{2}\right)^2 + 5\left(\frac{1}{2}\right) + r$$

$$\Rightarrow 0 = \frac{1}{4}p + \frac{5}{2} + r$$

$$\Rightarrow \frac{1}{4}p + r = -\frac{5}{2}$$

$$\Rightarrow p + 4r = -10 \quad \dots \text{(ii)}$$

From equations (i) and (ii), we get

$$p + 4r = 4p + r$$

$$\Rightarrow 3r = 3p$$

$$\Rightarrow p = r$$

