

# Mathematics

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

(Class – IX)

## Exercise 2.3

### Question 14:

By Remainder Theorem find the remainder, when  $p(x)$  is divided by  $g(x)$ , where

(i)  $p(x) = x^3 - 2x^2 - 4x - 1$ ,  $g(x) = x + 1$

(ii)  $p(x) = x^3 - 3x^2 + 4x + 50$ ,  $g(x) = x - 3$

(iii)  $p(x) = 4x^3 - 12x^2 + 14x - 3$ ,  $g(x) = 2x - 1$

(iv)  $p(x) = x^3 - 6x^2 + 2x - 4$ ,  $g(x) = 1 - \frac{3}{2}x$

### Answer 14:

(i). We have  $p(x) = x^3 - 2x^2 - 4x - 1$ ,  $g(x) = x + 1$

Put  $g(x) = 0$

$\Rightarrow x + 1 = 0$

$\Rightarrow x = -1$

According to remainder theorem if  $p(x)$  is divided by  $g(x)$ , the remainder is given by

$p(-1)$

$= (-1)^3 - 2(-1)^2 - 4(-1) - 1$

$= -1 - 2 + 4 - 1$

$= 0$

(ii). We have  $p(x) = x^3 - 3x^2 + 4x + 50$ ,  $g(x) = x - 3$

Put  $g(x) = 0$

$\Rightarrow x - 3 = 0$

$\Rightarrow x = 3$

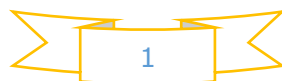
According to remainder theorem if  $p(x)$  is divided by  $g(x)$ , the remainder is given by

$p(3)$

$= (3)^3 - 3(3)^2 + 4(3) + 50$

$= 27 - 27 + 12 + 50$

$= 62$



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(iii). We have  $p(x) = 4x^3 - 12x^2 + 14x - 3$ ,  $g(x) = 2x - 1$

Put  $g(x) = 0$

$$\Rightarrow 2x - 1 = 0$$

$$\Rightarrow x = \frac{1}{2}$$

According to remainder theorem if  $p(x)$  is divided by  $g(x)$ , the remainder is given by

$$\begin{aligned} & p\left(\frac{1}{2}\right) \\ &= 4\left(\frac{1}{2}\right)^3 - 12\left(\frac{1}{2}\right)^2 + 14\left(\frac{1}{2}\right) - 3 \\ &= 4 \times \frac{1}{8} - 12 \times \frac{1}{4} + 14 \times \frac{1}{2} - 3 \\ &= \frac{1}{2} - 3 + 7 - 3 = \frac{3}{2} \end{aligned}$$

(iv). We have  $p(x) = x^3 - 6x^2 + 2x - 4$ ,  $g(x) = 1 - \frac{3}{2}x$

Put  $g(x) = 0$

$$\Rightarrow 1 - \frac{3}{2}x = 0 \Rightarrow x = \frac{2}{3}$$

According to remainder theorem if  $p(x)$  is divided by  $g(x)$ , the remainder is given by

$$\begin{aligned} & p\left(\frac{2}{3}\right) \\ &= \left(\frac{2}{3}\right)^3 - 6\left(\frac{2}{3}\right)^2 + 2\left(\frac{2}{3}\right) - 4 \\ &= \frac{8}{27} - 6 \times \frac{4}{9} + 2 \times \frac{2}{3} - 4 \\ &= \frac{8}{27} - \frac{24}{9} + \frac{4}{3} - 4 \\ &= \frac{8 - 72 + 36 - 108}{27} \\ &= \frac{44 - 180}{27} = -\frac{136}{27} \end{aligned}$$

