

# Mathematics

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

(Class – IX)

## Exercise 2.3

### Question 18:

Show that  $p - 1$  is a factor of  $p^{10} - 1$  and also of  $p^{11} - 1$ .

### Answer 18:

We have  $g(p) = p^{10} - 1$ ,  $h(p) = p - 1$

Put  $h(p) = 0$

$$\Rightarrow p - 1 = 0$$

$$\Rightarrow p = 1$$


According to factor theorem if  $h(p)$  is a factor of  $g(p)$ , the remainder  $g(1)$  should be zero.

Remainder =  $g(1)$

$$= (1)^{10} - 1$$

$$= 1 - 1 = 0$$

$\Rightarrow h(p)$  is a factor of  $g(p)$ .

Now, we have  $f(p) = p^{11} - 1$ ,   $h(p) = p - 1$

Put  $h(p) = 0$

$$\Rightarrow p - 1 = 0$$

$$\Rightarrow p = 1$$

According to factor theorem if  $h(p)$  is a factor of  $f(p)$ , the remainder  $f(1)$  should be zero.

Remainder =  $f(1)$

$$= (1)^{11} - 1$$

$$= 1 - 1 = 0$$

$\Rightarrow h(p)$  is a factor of  $f(p)$ .

