

# Mathematics

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

## Exercise 2.1

Write the correct answer in each of the following:

### Question 13:

$x + 1$  is a factor of the polynomial

(A)  $x^3 + x^2 - x + 1$

(B)  $x^3 + x^2 + x + 1$

(C)  $x^4 + x^3 + x^2 + 1$

(D)  $x^4 + 3x^3 + 3x^2 + x + 1$

### Answer 13:

(B)  $x^3 + x^2 + x + 1$

### Solution:

According to factor theorem, if the polynomial is divided by  $x + 1$ , the remainder is 0.

In case (A),  $p(x) = x^3 + x^2 - x + 1$

$$\Rightarrow p(-1) = (-1)^3 + (-1)^2 - (-1) + 1 = -1 + 1 + 1 + 1 = 2 \neq 0$$

So,  $x + 1$  is not a factor of this polynomial.

In case (B),  $p(x) = x^3 + x^2 + x + 1$

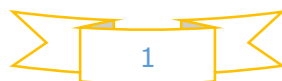
$$\Rightarrow p(-1) = (-1)^3 + (-1)^2 + (-1) + 1 = -1 + 1 - 1 + 1 = 0$$

So,  $x + 1$  is a factor of this polynomial.

In case (C),  $p(x) = x^4 + x^3 + x^2 + 1$

$$\Rightarrow p(-1) = (-1)^4 + (-1)^3 + (-1)^2 + 1 = 1 - 1 + 1 + 1 = 2 \neq 0$$

So,  $x + 1$  is not a factor of this polynomial.



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In case (D),  $p(x) = x^4 + 3x^3 + 3x^2 + x + 1$

$$\Rightarrow p(-1) = (-1)^4 + 3(-1)^3 + 3(-1)^2 + (-1) + 1$$

$$= 1 - 3 + 3 - 1 + 1 = 1 \neq 0$$

So,  $x + 1$  is not a factor of this polynomial.

Hence, the option (B) is correct.

