ALGEBRA EXAMPLE 3

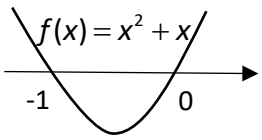
If x is a real number, which of the following statements is true?

(A) $x^2 + x$ is always positive
(B) $x^2 + x$ is always greater than or equal to x^2
(C) $x^2 + x$ is always greater than or equal to x
(D) $x^2 + x$ is never equal to 0

SOLUTION

Check Statement A: $x^2 + x$ is always positive

$$\therefore x^2 + x > 0$$
$$\therefore x(x+1) > 0$$



x-intercepts are at x = -1 and x = 0
Function is negative if $-1 < x < 0$
So, Statement A is false.

Check Statement B: $x^2 + x$ is always greater than or equal to x^2

$$\therefore x^2 + x \geq x^2$$
$$\therefore x \geq 0$$

This is not true if $x < 0$
So, Statement B is false.

Check Statement C: $x^2 + x$ is always greater than or equal to x

$$\therefore x^2 + x \geq x$$
$$\therefore x^2 \geq 0$$

This is true for all values of x.
So, Statement C is true.

(E) Check Statement D: $x^2 + x$ is never equal to 0

$$\therefore x^2 + x = 0$$
$$\therefore x(x+1) = 0$$
$$\therefore x = 0 \text{ or } x = -1$$

So, Statement D is false.

The correct answer is C