

- The number of real values of x for which the equality $|3x^2+12x+6|=5x+16$ holds good is
 - A) 4
 - B) 3
 - C) 2
 - D) 1

Correct Answer: C

Solution:

Given Equation is $|3x^2+12x+6|=5x+16$(i)

when $3x^2+12x+6 \geq 0$
 $\Leftrightarrow x^2+4x \geq -2$

$$\Leftrightarrow |x+2| \geq 4-2 \Leftrightarrow |x+2| \geq (2\sqrt{2})^2$$

$$\Leftrightarrow x+2 \leq -2\sqrt{2}$$

or

$$x+2 \geq 2 \text{..... (ii)}$$

Then (i) becomes

$$3x^2+12x+6=5x+16$$

$$\Leftrightarrow 3x^2+7x-10=0 \Rightarrow x=1, -10/3$$

But

$x=-10/3$ does not satisfy (ii).

When $3x^2+12x+6 < 0$

$$\Rightarrow x^2+4x < -2$$

$$|x+2| \leq 2\sqrt{2}$$

$$\Rightarrow -2\sqrt{2} - 2 \leq x \leq -2 + 2\sqrt{2} \dots\dots (iii)$$

Then (i) becomes

$$\Rightarrow 3x^2 + 12x + 6 = -(5x + 16)$$

$$\Rightarrow 3x^2 + 17x + 22 = 0 \Rightarrow x = -2, -113$$

But

$$x = -113$$

does not satisfy (iii).

So, 1 and -2 are the only solutions.