4 **JEE Main 2021 (Online) 16th March Morning Shift**
MCQ (Single Correct Answer)

The number of elements in the set $\{x \in R : (|x| - 3) |x + 4| = 6\}$ is equal to :

A 4

B 2

C 3

D 1

Explanation

Case 1 :

$x \leq -4$

$(-x - 3)(-x - 4) = 6$

$\Rightarrow (x + 3)(x + 4) = 6$

$\Rightarrow x^2 + 7x + 6 = 0$

$\Rightarrow x = -1$ or -6

but $x \leq -4$

$x = -6$

Case 2 :

$x \in (-4, 0)$

$(-x - 3)(x + 4) = 6$

$\Rightarrow -x^2 - 7x - 12 - 6 = 0$

$\Rightarrow x^2 + 7x + 18 = 0$

$D < 0$ No solution

Case 3 :

$x \geq 0$

$(x - 3)(x + 4) = 6$

$\Rightarrow x^2 + x - 12 - 6 = 0$

$\Rightarrow x^2 + x - 18 = 0$

$x = \frac{-1 \pm \sqrt{1 + 72}}{2}$

$\therefore x = \frac{\sqrt{73} - 1}{2}$ only

This problem does seem lengthy but the concept used here is very basic. It is just an repetative application quadratic equations and set theory.