YOU & MATHS How many different real numbers satisfy the equation below?

$$(x^2 + 4x - 2)^2 = (5x^2 - 1)^2$$

A 0   **B** 1   **C** 2   **D** 3   **E** 4

(USA *University of South Carolina: High School Math Contest,* 2003)

We can take the square root of both sides of the equation in order to get rid of the square power. By doing so, we obtain:

$$x^2 + 4x - 2 = \pm(5x^2 - 1),$$

where the plus and minus sign comes from applying the square root.

Let us solve the two equations that we have identified.

- $x^2 + 4x - 2 = 5x^2 - 1 \quad 4x^2 - 4x + 1 = 0$
- $x^2 + 4x - 2 = -(5x^2 - 1) \quad x^2 + 4x - 2 = -5x^2 + 1 \quad 6x^2 + 4x - 3 = 0$

We have thus identified three different solutions for our initial equation. Our final answer is D.