

Answer on Question #49446 – Math – Algebra

Task:

The zeros of a polynomial function are given as $x_1=3$ and $x_2=1/2$. Which of the following expressions could represent the polynomial expression?

- A. $2x^2+5x-3$
- B. $2x^2-5x-3$
- C. $2x^2-7x+3$
- D. $2x^2+7x+3$

Solution:

Method 1.

$ax^2 + bx + c = 0$, consider each of possible cases.

$$D = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \Rightarrow$$

$$D_{A,2} = \frac{-5 \pm \sqrt{25 + 24}}{4} = \begin{cases} \frac{1}{2} \\ -3 \end{cases}$$

$$D_{B,2} = \frac{5 \pm \sqrt{25 + 24}}{4} = \begin{cases} 3 \\ -\frac{1}{2} \end{cases}$$

$$D_{C,2} = \frac{7 \pm \sqrt{49 - 24}}{4} = \begin{cases} 3 \\ \frac{1}{2} \end{cases}$$

$$D_{D,2} = \frac{-7 \pm \sqrt{49 - 24}}{4} = \begin{cases} -\frac{1}{2} \\ -3 \end{cases}$$

So, $C. 2x^2-7x+3$ is correct.

Method 2.

Knowing roots of quadratic function, we can express

$$a(x - x_1)(x - x_2) = a(x - 3)\left(x - \frac{1}{2}\right) = a\left(x^2 - \left(3 + \frac{1}{2}\right)x + \frac{3}{2}\right) = a\left(x^2 - \frac{7}{2}x + \frac{3}{2}\right)$$

All presented cases begin with $2x^2$, therefore take $a = 2$, obtain

$$a\left(x^2 - \frac{7}{2}x + \frac{3}{2}\right) = 2\left(x^2 - \frac{7}{2}x + \frac{3}{2}\right) = 2x^2 - 7x + 3.$$

So, $C. 2x^2-7x+3$ is correct.

Answer: C. $2x^2-7x+3$