

Answer on Question #56453 – Math – Algebra

Question 1

Which of the following is a root of the polynomial shown below?

$$f(x) = x^3 + 2x^2 - x - 2$$

- A: 2
- B: 0
- C: 3
- D: 1

Solution

If $x = 1$, then $f(1) = 1^3 + 2 \cdot 1^2 - 1 - 2 = 0$.

Answer: D: 1

Question 2

Which of the following represents the set of possible rational roots for the polynomial shown below?

$$2x^3 + 5x^2 - 8x - 10 = 0$$

- A: $\{\pm\frac{1}{2}, \pm 1, \pm 2, \pm\frac{5}{2}, \pm 5, \pm 10\}$
- B: $\{\frac{1}{2}, 1, 2, \frac{5}{2}, 4, 5, 10, 20\}$
- C: $\{\pm\frac{2}{5}, \pm\frac{1}{2}, \pm 1, \pm 2, \pm\frac{2}{5}, \pm\frac{1}{5}, \pm\frac{1}{10}\}$
- D: $\{\pm 1, \pm 2, \pm 4, \pm 5, \pm 10, \pm 20\}$

Solution

According to the rational root theorem, each rational solution x can be written as a fraction $\frac{p}{q}$, where p is an integer factor of -10 (the constant term of the polynomial) and q is an integer factor of 2 (the leading coefficient).

Answer: A: $\{\pm\frac{1}{2}, \pm 1, \pm 2, \pm\frac{5}{2}, \pm 5, \pm 10\}$

Question 3

Which of the following expresses the possible number of positive real solutions for the polynomial equation shown below?

$$x^3 - 4x^2 - 7x + 28 = 0$$

- A: one
- B: Three or one
- C: Two or Zero
- D: Two

Solution

Using Descartes' Rule of Signs, count the number of sign changes: $+x^3 - 4x^2 - 7x + 28 \Rightarrow + - - +$. So, we get two changes in sign, hence there are at most two positive roots. So, there could be two or zero positive roots.

Answer: C. Two or Zero.

Question 4

A polynomial has one root that equals $5 - 7i$. Name one other root of this polynomial.

Answer: $5 + 7i$.

Question 5

If a polynomial has one root in the form $a + \sqrt{b}$, it has a second root in the form of $a \text{ ______ } \sqrt{b}$

Answer: $a - \sqrt{b}$.