1. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder $r$.

$$\frac{9x^3 - 21x^2 + 10}{x - 2}$$

A. $a \in [3, 12], b \in [-40, -38], c \in [73, 83]$, and $r \in [-151, -144]$.

B. $a \in [3, 12], b \in [-16, -10], c \in [-13, -10]$, and $r \in [-5, 1]$.

C. $a \in [15, 20], b \in [14, 20], c \in [29, 38]$, and $r \in [62, 75]$.

D. $a \in [15, 20], b \in [-59, -54], c \in [113, 120]$, and $r \in [-220, -210]$.

E. $a \in [3, 12], b \in [-8, -2], c \in [-11, -1]$, and $r \in [-5, 1]$.

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2. Factor the polynomial below completely, knowing that $x - 2$ is a factor. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3 \leq z_4$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 6x^4 + 31x^3 + 5x^2 - 122x - 120$$

A. $z_1 \in [-3, 2]$, $z_2 \in [0.56, 0.81], z_3 \in [0.47, 1]$, and $z_4 \in [3.2, 4.6]$

B. $z_1 \in [-8, -3]$, $z_2 \in [-0.8, -0.41], z_3 \in [-0.66, -0.15]$, and $z_4 \in [1.8, 3.3]$

C. $z_1 \in [-3, 2]$, $z_2 \in [0.66, 0.85], z_3 \in [2.76, 4.17]$, and $z_4 \in [3.2, 4.6]$

D. $z_1 \in [-3, 2]$, $z_2 \in [1.5, 1.54], z_3 \in [0.96, 2.43]$, and $z_4 \in [3.2, 4.6]$

E. $z_1 \in [-8, -3]$, $z_2 \in [-1.78, -1.63], z_3 \in [-1.97, -1.17]$, and $z_4 \in [1.8, 3.3]$

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3. Perform the division below. Then, find the intervals that correspond to the quotient in the form $ax^2 + bx + c$ and remainder $r$.

$$\frac{6x^3 - 38x^2 + 76x - 50}{x - 3}$$

A. $a \in [15, 20], \; b \in [9, 20], \; c \in [123, 131], \text{ and } r \in [319, 324]$.

B. $a \in [4, 8], \; b \in [-29, -21], \; c \in [20, 26], \text{ and } r \in [-3, 3]$.

C. $a \in [15, 20], \; b \in [-99, -91], \; c \in [347, 355], \text{ and } r \in [-1112, -1102]$.

D. $a \in [4, 8], \; b \in [-24, -19], \; c \in [14, 22], \text{ and } r \in [-3, 3]$.

E. $a \in [4, 8], \; b \in [-59, -54], \; c \in [243, 247], \text{ and } r \in [-783, -777]$.

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4. Factor the polynomial below completely. Then, choose the intervals the zeros of the polynomial belong to, where $z_1 \leq z_2 \leq z_3$. *To make the problem easier, all zeros are between -5 and 5.*

$$f(x) = 9x^3 + 9x^2 - 28x - 20$$

A. $z_1 \in [-1.92, -1.5], \; z_2 \in [0.54, 0.69], \text{ and } z_3 \in [1.89, 2.3]$

B. $z_1 \in [-5.17, -4.86], \; z_2 \in [0.01, 0.57], \text{ and } z_3 \in [1.89, 2.3]$

C. $z_1 \in [-2.19, -1.97], \; z_2 \in [-1.64, -1.25], \text{ and } z_3 \in [0.37, 0.66]$

D. $z_1 \in [-0.88, -0.21], \; z_2 \in [1.24, 1.7], \text{ and } z_3 \in [1.89, 2.3]$

E. $z_1 \in [-2.19, -1.97], \; z_2 \in [-1.1, -0.25], \text{ and } z_3 \in [1.49, 1.7]$

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5. What are the *possible Integer* roots of the polynomial below?

$$f(x) = 2x^2 + 5x + 4$$

A. $\pm 1, \pm 2$

B. $\pm 1, \pm 2, \pm 4$

C. All combinations of: $\dfrac{\pm 1, \pm 2}{\pm 1, \pm 2, \pm 4}$

D. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 4}{\pm 1, \pm 2}$

E. There is no formula or theorem that tells us all possible Integer roots.

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