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

$$\frac{9x^3 - 28x - 13}{x - 2}$$

A. $a \in [14, 20], b \in [29, 40], c \in [36, 45],$ and $r \in [71, 77]$.

B. $a \in [2, 10], b \in [6, 13], c \in [-22, -14],$ and $r \in [-37, -30]$.

C. $a \in [14, 20], b \in [-42, -35], c \in [36, 45],$ and $r \in [-104, -95]$.

D. $a \in [2, 10], b \in [15, 20], c \in [6, 10],$ and $r \in [2, 5]$.

E. $a \in [2, 10], b \in [-22, -16], c \in [6, 10],$ and $r \in [-31, -23]$.

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

$$\frac{6x^3 + 9x^2 - 51x + 34}{x + 4}$$

A. $a \in [-2, 9],\ b \in [-24, -18],\ c \in [48, 56],$ and $r \in [-238, -229]$.

B. $a \in [-2, 9],\ b \in [-17, -13],\ c \in [3, 12],$ and $r \in [-5, 3]$.

C. $a \in [-30, -21],\ b \in [-90, -86],\ c \in [-402, -396],$ and $r \in [-1563, -1558]$.

D. $a \in [-2, 9],\ b \in [28, 36],\ c \in [76, 85],$ and $r \in [354, 359]$.

E. $a \in [-30, -21],\ b \in [104, 113],\ c \in [-472, -465],$ and $r \in [1913, 1924]$.

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

$$f(x) = 2x^3 + 3x^2 + 7x + 3$$

A. $\pm 1, \pm 3$

B. All combinations of: $\dfrac{\pm 1, \pm 3}{\pm 1, \pm 2}$

C. All combinations of: $\dfrac{\pm 1, \pm 2}{\pm 1, \pm 3}$

D. $\pm 1, \pm 2$

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

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4. Factor the polynomial below completely, knowing that $x+5$ 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.*

$$f(x) = 6x^4 + 55x^3 + 117x^2 - 88x - 240$$

A. $z_1 \in [-5.54, -4.65]$, $z_2 \in [-4.26, -3.9]$, $z_3 \in [-2.14, -0.83]$, and $z_4 \in [1.27, 1.9]$

B. $z_1 \in [-1.37, -1.22]$, $z_2 \in [1.32, 1.6]$, $z_3 \in [3.23, 4.14]$, and $z_4 \in [4.12, 5.15]$

C. $z_1 \in [-1.05, -0.46]$, $z_2 \in [0.66, 0.73]$, $z_3 \in [3.23, 4.14]$, and $z_4 \in [4.12, 5.15]$

D. $z_1 \in [-4.96, -3.52]$, $z_2 \in [0.44, 0.51]$, $z_3 \in [3.23, 4.14]$, and $z_4 \in [4.12, 5.15]$

E. $z_1 \in [-5.54, -4.65]$, $z_2 \in [-4.26, -3.9]$, $z_3 \in [-1.49, -0.16]$, and $z_4 \in [-0.12, 1.25]$

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5. 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.*

$$f(x) = 4x^3 - 4x^2 - 33x + 45$$

A. $z_1 \in [-2.7, -2.1]$, $z_2 \in [-2.08, -0.87]$, and $z_3 \in [2.7, 3.47]$

B. $z_1 \in [-3.8, -2.9]$, $z_2 \in [0.15, 0.55]$, and $z_3 \in [0.49, 0.74]$

C. $z_1 \in [-1.8, 0.2]$, $z_2 \in [-0.49, -0.08]$, and $z_3 \in [2.7, 3.47]$

D. $z_1 \in [-3.8, -2.9]$, $z_2 \in [1.25, 1.89]$, and $z_3 \in [1.76, 2.8]$

E. $z_1 \in [-5.1, -4.8]$, $z_2 \in [-1.25, -0.55]$, and $z_3 \in [2.7, 3.47]$
