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

$$\frac{4x^3 - 12x + 5}{x + 2}$$

A. $a \in [0, 5], b \in [3, 9], c \in [1, 7],$ and $r \in [11, 17]$.

B. $a \in [-14, -6], b \in [15, 20], c \in [-48, -39],$ and $r \in [91, 94]$.

C. $a \in [0, 5], b \in [-10, -2], c \in [1, 7],$ and $r \in [-7, -1]$.

D. $a \in [-14, -6], b \in [-18, -13], c \in [-48, -39],$ and $r \in [-84, -78]$.

E. $a \in [0, 5], b \in [-13, -10], c \in [23, 26],$ and $r \in [-69, -66]$.

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2. 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.*

$$f(x) = 6x^3 - 5x^2 - 22x + 24$$

A. $z_1 \in [-2.82, -1.65],\ z_2 \in [-0.5, 0.9],$ and $z_3 \in [0.25, 1.03]$

B. $z_1 \in [-3.34, -2.54],\ z_2 \in [-1, -0.3],$ and $z_3 \in [1.94, 2.41]$

C. $z_1 \in [-2.82, -1.65],\ z_2 \in [1.2, 2.2],$ and $z_3 \in [1.45, 1.52]$

D. $z_1 \in [-1.57, -1.04],\ z_2 \in [-1.9, -1.2],$ and $z_3 \in [1.94, 2.41]$

E. $z_1 \in [-0.93, -0.6],\ z_2 \in [-1, -0.3],$ and $z_3 \in [1.94, 2.41]$

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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.

$$\frac{6x^3 + 43x^2 + 86x + 38}{x + 4}$$

A. $a \in [2, 10],\ b \in [17, 21],\ c \in [8, 17],$ and $r \in [-3, 0]$.

B. $a \in [-33, -18],\ b \in [134, 145],\ c \in [-473, -467],$ and $r \in [1917, 1919]$.

C. $a \in [2, 10]$, $b \in [65, 70]$, $c \in [349, 360]$, and $r \in [1451, 1462]$.

D. $a \in [2, 10]$, $b \in [11, 15]$, $c \in [19, 25]$, and $r \in [-75, -65]$.

E. $a \in [-33, -18]$, $b \in [-57, -51]$, $c \in [-131, -118]$, and $r \in [-469, -465]$.

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

$$f(x) = 2x^4 + 4x^3 + 3x^2 + 7x + 7$$

A. All combinations of: $\dfrac{\pm 1, \pm 7}{\pm 1, \pm 2}$

B. $\pm 1, \pm 2$

C. $\pm 1, \pm 7$

D. All combinations of: $\dfrac{\pm 1, \pm 2}{\pm 1, \pm 7}$

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

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5. 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.*

$$f(x) = 10x^4 + 33x^3 - 165x^2 - 448x - 240$$

A. $z_1 \in [-4.2, -1.2]$, $z_2 \in [0.22, 0.43]$, $z_3 \in [2.96, 3.09]$, and $z_4 \in [4.04, 5.73]$

B. $z_1 \in [-7.3, -4.2]$, $z_2 \in [-1.53, -1.46]$, $z_3 \in [-0.94, -0.78]$, and $z_4 \in [3.87, 4.67]$

C. $z_1 \in [-4.2, -1.2]$, $z_2 \in [0.47, 0.77]$, $z_3 \in [0.9, 1.27]$, and $z_4 \in [4.04, 5.73]$

D. $z_1 \in [-7.3, -4.2]$, $z_2 \in [-1.39, -1.22]$, $z_3 \in [-0.72, -0.65]$, and $z_4 \in [3.87, 4.67]$

E. $z_1 \in [-4.2, -1.2]$, $z_2 \in [0.74, 1]$, $z_3 \in [1.36, 1.51]$, and $z_4 \in [4.04, 5.73]$