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

$$\frac{12x^3 - 16x^2 - 108x - 75}{x - 4}$$

A. $a \in [47, 51],\ b \in [-209, -207],\ c \in [717, 728],$ and $r \in [-2976, -2965].$

B. $a \in [8, 17],\ b \in [17, 21],\ c \in [-52, -46],$ and $r \in [-220, -216].$

C. $a \in [8, 17],\ b \in [31, 40],\ c \in [16, 23],$ and $r \in [2, 10].$

D. $a \in [8, 17],\ b \in [-67, -62],\ c \in [145, 149],$ and $r \in [-670, -662].$

E. $a \in [47, 51],\ b \in [173, 177],\ c \in [587, 598],$ and $r \in [2305, 2313].$

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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.*

$$f(x) = 6x^3 + 13x^2 - 40x - 75$$

A. $z_1 \in [-1.05, -0.83],\ z_2 \in [2.61, 3.51],$ and $z_3 \in [4.84, 5.5]$

B. $z_1 \in [-2.55, -2.4],\ z_2 \in [1, 2.02],$ and $z_3 \in [2.54, 3.31]$

C. $z_1 \in [-0.59, -0.3],\ z_2 \in [0.53, 0.84],$ and $z_3 \in [2.54, 3.31]$

D. $z_1 \in [-3.02, -2.94],\ z_2 \in [-0.92, -0.12],$ and $z_3 \in [0.06, 0.76]$

E. $z_1 \in [-3.02, -2.94],\ z_2 \in [-2.29, -1.21],$ and $z_3 \in [2.31, 2.87]$

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3. 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.*

$$f(x) = 9x^4 - 63x^3 + 74x^2 + 112x - 160$$

A. $z_1 \in [-6.6, -2.9]$, $z_2 \in [-3.01, -1.54]$, $z_3 \in [-0.7, -0.27]$, and $z_4 \in [3.8, 4.1]$

B. $z_1 \in [-6.6, -2.9]$, $z_2 \in [-3.01, -1.54]$, $z_3 \in [-1.52, -0.93]$, and $z_4 \in [0.9, 1.7]$

C. $z_1 \in [-2, -1.1]$, $z_2 \in [1.09, 1.58]$, $z_3 \in [1.9, 2.44]$, and $z_4 \in [4.1, 5.1]$

D. $z_1 \in [-6.6, -2.9]$, $z_2 \in [-3.01, -1.54]$, $z_3 \in [-1.03, -0.53]$, and $z_4 \in [0.3, 1.3]$

E. $z_1 \in [-0.8, 0.5]$, $z_2 \in [0.42, 0.86]$, $z_3 \in [1.9, 2.44]$, and $z_4 \in [4.1, 5.1]$

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

$$\frac{20x^3 - 60x + 42}{x + 2}$$

A. $a \in [18, 24], b \in [31, 44], c \in [16, 24]$, and $r \in [80, 87]$.

B. $a \in [18, 24], b \in [-65, -55], c \in [118, 121]$, and $r \in [-324, -317]$.

C. $a \in [-41, -37], b \in [79, 84], c \in [-222, -211]$, and $r \in [477, 488]$.

D. $a \in [18, 24], b \in [-47, -37], c \in [16, 24]$, and $r \in [-2, 3]$.

E. $a \in [-41, -37], b \in [-83, -76], c \in [-222, -211]$, and $r \in [-399, -397]$.

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

$$f(x) = 6x^2 + 3x + 3$$

A. $\pm 1, \pm 3$

B. All combinations of: $\dfrac{\pm 1, \pm 3}{\pm 1, \pm 2, \pm 3, \pm 6}$

C. $\pm 1, \pm 2, \pm 3, \pm 6$

D. All combinations of: $\dfrac{\pm 1, \pm 2, \pm 3, \pm 6}{\pm 1, \pm 3}$

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