1. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 11$ and choose the interval that $f^{-1}(11)$ belongs to.

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

A. $f^{-1}(11) \in [1.65, 1.89]$

B. $f^{-1}(11) \in [4.83, 5.13]$

C. $f^{-1}(11) \in [2.82, 3.03]$

D. $f^{-1}(11) \in [2.59, 2.81]$

E. The function is not invertible for all Real numbers.

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2. Determine whether the function below is 1-1.

$$f(x) = 36x^2 + 420x + 1225$$

A. Yes, the function is 1-1.

B. No, because the domain of the function is not $(-\infty, \infty)$.

C. No, because there is an x-value that goes to 2 different y-values.

D. No, because there is a y-value that goes to 2 different x-values.

E. No, because the range of the function is not $(-\infty, \infty)$.

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3. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = 3x^3 - 3x^2 - 2x + 3 \text{ and } g(x) = -x^3 - 1x^2 - 3x$$

A. $(f \circ g)(-1) \in [-11, -1]$

B. $(f \circ g)(-1) \in [2, 4]$

C. $(f \circ g)(-1) \in [42, 45]$

D. $(f \circ g)(-1) \in [48, 58]$

E. It is not possible to compose the two functions.

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4. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{1}{6x + 29} \text{ and } g(x) = \frac{4}{5x - 27}$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-5.6, 3.4]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-8.67, -1.67]$

C. The domain is all Real numbers except $x = a$, where $a \in [-8.25, 0.75]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-6.83, -3.83]$ and $b \in [3.4, 8.4]$

E. The domain is all Real numbers.

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5. Find the inverse of the function below. Then, evaluate the inverse at $x = 7$ and choose the interval that $f^{-1}(7)$ belongs to.

$$f(x) = e^{x+3} + 2$$

A. $f^{-1}(7) \in [4.38, 4.67]$

B. $f^{-1}(7) \in [-1.58, -1.34]$

C. $f^{-1}(7) \in [4, 4.2]$

D. $f^{-1}(7) \in [4.21, 4.54]$

E. $f^{-1}(7) \in [3.37, 3.41]$

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6. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{1}{4x + 25} \text{ and } g(x) = \frac{3}{3x - 20}$$

A. The domain is all Real numbers except $x = a$, where $a \in [-5.17, -2.17]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-15.2, -4.2]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [0.33, 3.33]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-9.25, -2.25]$ and $b \in [3.67, 16.67]$

E. The domain is all Real numbers.

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7. Determine whether the function below is 1-1.

$$f(x) = (5x - 31)^3$$

A. No, because there is an x-value that goes to 2 different y-values.

B. No, because the domain of the function is not $(-\infty, \infty)$.

C. Yes, the function is 1-1.

D. No, because there is a y-value that goes to 2 different x-values.

E. No, because the range of the function is not $(-\infty, \infty)$.

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8. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 11$ and choose the interval the $f^{-1}(11)$ belongs to.

$$f(x) = \sqrt[3]{4x + 2}$$

A. $f^{-1}(11) \in [332.1, 332.6]$

B. $f^{-1}(11) \in [332.7, 334.5]$

C. $f^{-1}(11) \in [-333, -332]$

D. $f^{-1}(11) \in [-335.1, -332.4]$

E. The function is not invertible for all Real numbers.

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9. Find the inverse of the function below. Then, evaluate the inverse at $x = 9$ and choose the interval that $f^{-1}(9)$ belongs to.

$$f(x) = \ln(x + 4) - 2$$

A. $f^{-1}(9) \in [1089.63, 1096.63]$

B. $f^{-1}(9) \in [59877.14, 59887.14]$

C. $f^{-1}(9) \in [442404.39, 442424.39]$

D. $f^{-1}(9) \in [59870.14, 59872.14]$

E. $f^{-1}(9) \in [144.41, 150.41]$

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10. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = 2x^3 + 3x^2 - x \text{ and } g(x) = 4x^3 + 3x^2 + x + 4$$

A. $(f \circ g)(-1) \in [25, 29]$

B. $(f \circ g)(-1) \in [42, 43]$

C. $(f \circ g)(-1) \in [46, 51]$

D. $(f \circ g)(-1) \in [32, 38]$

E. It is not possible to compose the two functions.
