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.

$$f(x) = 3x^2 - 2$$

A. $f^{-1}(11) \in [1.93, 2.58]$

B. $f^{-1}(11) \in [4.79, 5.22]$

C. $f^{-1}(11) \in [1.54, 2]$

D. $f^{-1}(11) \in [3.84, 4.62]$

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

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

$$f(x) = 15x^2 - 8x - 384$$

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

B. Yes, the function is 1-1.

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

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

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

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

$$f(x) = -12x^2 - 44x + 240$$

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

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

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

D. Yes, the function is 1-1.

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

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4. Find the inverse of the function below. Then, evaluate the inverse at $x = 6$ and choose the interval that $f^{-1}(6)$ belongs to.

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

A. $f^{-1}(6) \in [4.3, 4.46]$

B. $f^{-1}(6) \in [3.85, 4.09]$

C. $f^{-1}(6) \in [3.08, 3.25]$

D. $f^{-1}(6) \in [-1.74, -1.49]$

E. $f^{-1}(6) \in [4.15, 4.29]$

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

$$f(x) = 3x + 3 \text{ and } g(x) = 2x^3 + x^2 + 7x + 5$$

A. The domain is all Real numbers except $x = a$, where $a \in [2.25, 10.25]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-1.75, 6.25]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [4.2, 5.2]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-7.67, -0.67]$ and $b \in [-7.75, -0.75]$

E. The domain is all Real numbers.

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6. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 10$ and choose the interval that $f^{-1}(10)$ belongs to.

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

A. $f^{-1}(10) \in [0.99, 2.48]$

B. $f^{-1}(10) \in [1.92, 3.54]$

C. $f^{-1}(10) \in [4.5, 5.73]$

D. $f^{-1}(10) \in [3.37, 3.66]$

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

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

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

A. $(f \circ g)(-1) \in [-8, -5]$

B. $(f \circ g)(-1) \in [38, 47]$

C. $(f \circ g)(-1) \in [36, 41]$

D. $(f \circ g)(-1) \in [-3, 1]$

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

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

$$f(x) = \sqrt{-4x + 18} \text{ and } g(x) = 4x^3 + 7x^2 + 5x + 3$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [1.33, 7.33]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-1.5, 5.5]$

C. The domain is all Real numbers except $x = a$, where $a \in [-10.33, 1.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [1.4, 6.4]$ and $b \in [-8.25, -5.25]$

E. The domain is all Real numbers.

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

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

A. $(f \circ g)(1) \in [-46, -40]$

B. $(f \circ g)(1) \in [-11, -8]$

C. $(f \circ g)(1) \in [-23, -14]$

D. $(f \circ g)(1) \in [-53, -49]$

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

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

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

A. $f^{-1}(9) \in [442403.39, 442415.39]$

B. $f^{-1}(9) \in [1088.63, 1094.63]$

C. $f^{-1}(9) \in [442412.39, 442419.39]$

D. $f^{-1}(9) \in [59868.14, 59871.14]$

E. $f^{-1}(9) \in [140.41, 147.41]$
