1. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^{-1}(-15)$ belongs to.

$$f(x) = 4x^2 + 5$$

A. $f^{-1}(-15) \in [1.71, 3.74]$

B. $f^{-1}(-15) \in [3.46, 5.19]$

C. $f^{-1}(-15) \in [6.17, 7.76]$

D. $f^{-1}(-15) \in [0.86, 2.11]$

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

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

$$f(x) = 2x^2 + 5x + 9 \text{ and } g(x) = \sqrt{-3x + 6}$$

A. The domain is all Real numbers except $x = a$, where $a \in [-6.33, -3.33]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [1, 6]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-8, -4]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-7.33, -3.33]$ and $b \in [4.33, 7.33]$

E. The domain is all Real numbers.

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

$$f(x) = (5x + 23)^3$$

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

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

C. Yes, the function is 1-1.

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

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

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

A. $f^{-1}(6) \in [22027.47, 22031.47]$

B. $f^{-1}(6) \in [7.39, 16.39]$

C. $f^{-1}(6) \in [7.39, 16.39]$

D. $f^{-1}(6) \in [22019.47, 22024.47]$

E. $f^{-1}(6) \in [-0.61, 6.39]$

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

$$f(x) = e^{x+5} + 4$$

A. $f^{-1}(9) \in [6.61, 6.65]$

B. $f^{-1}(9) \in [6.57, 6.63]$

C. $f^{-1}(9) \in [-3.4, -3.38]$

D. $f^{-1}(9) \in [5.37, 5.4]$

E. $f^{-1}(9) \in [6.55, 6.57]$

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

$$f(x) = 9x^2 - 120x + 400$$

A. Yes, the function is 1-1.

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

$$f(x) = 7x \text{ and } g(x) = \sqrt{5x - 32}$$

A. The domain is all Real numbers except $x = a$, where $a \in [-7.67, -1.67]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-7.17, -2.17]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [3.4, 9.4]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-5.67, -0.67]$ and $b \in [-14.33, -0.33]$

E. The domain is all Real numbers.

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

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

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

B. $(f \circ g)(1) \in [-74, -69]$

C. $(f \circ g)(1) \in [6, 12]$

D. $(f \circ g)(1) \in [-87, -74]$

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

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

$$f(x) = -3x^3 + 2x^2 - x + 1 \text{ and } g(x) = 4x^3 + 3x^2 - x - 4$$

A. $(f \circ g)(1) \in [-26, -19]$

B. $(f \circ g)(1) \in [-5, -2]$

C. $(f \circ g)(1) \in [2, 6]$

D. $(f \circ g)(1) \in [-19, -11]$

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

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10. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^{-1}(-15)$ belongs to.

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

A. $f^{-1}(-15) \in [1.78, 2.12]$

B. $f^{-1}(-15) \in [5.99, 6.23]$

C. $f^{-1}(-15) \in [3.05, 3.15]$

D. $f^{-1}(-15) \in [2.25, 2.46]$

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