1. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -12$ and choose the interval that $f^{-1}(-12)$ belongs to.

$$f(x) = 4x^2 - 3$$

A. $f^{-1}(-12) \in [2.2, 2.68]$

B. $f^{-1}(-12) \in [1.23, 1.57]$

C. $f^{-1}(-12) \in [4.36, 4.55]$

D. $f^{-1}(-12) \in [1.57, 2.36]$

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

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

$$f(x) = (6x + 24)^3$$

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

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

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

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

E. Yes, the function is 1-1.

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

$$f(x) = \sqrt{3x + 15}$$

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

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

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

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

E. Yes, the function is 1-1.

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

$$f(x) = e^{x-4} - 2$$

A. $f^{-1}(8) \in [-1.77, -1.45]$

B. $f^{-1}(8) \in [-0.88, -0.58]$

C. $f^{-1}(8) \in [6.06, 6.45]$

D. $f^{-1}(8) \in [0.26, 0.51]$

E. $f^{-1}(8) \in [-0.52, -0.02]$

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

$$f(x) = 9x \text{ and } g(x) = \sqrt{-3x - 4}$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-2.33, 0.67]$

B. The domain is all Real numbers except $x = a$, where $a \in [4.33, 7.33]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-9.67, -4.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-5.8, -3.8]$ and $b \in [-11.8, -2.8]$

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 $x = 12$ and choose the interval that $f^{-1}(12)$ belongs to.

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

A. $f^{-1}(12) \in [4.1, 5.34]$

B. $f^{-1}(12) \in [3.09, 3.9]$

C. $f^{-1}(12) \in [1.02, 1.28]$

D. $f^{-1}(12) \in [1.55, 2.02]$

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.

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

A. $(f \circ g)(-1) \in [3.4, 6.7]$

B. $(f \circ g)(-1) \in [-2.9, -1.2]$

C. $(f \circ g)(-1) \in [7.4, 8.1]$

D. $(f \circ g)(-1) \in [-1.7, 2.1]$

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.

$$f(x) = 7x^4 + 7x^3 + 4x^2 + 2x + 9 \text{ and } g(x) = \sqrt{3x + 20}$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-13.67, -3.67]$

B. The domain is all Real numbers except $x = a$, where $a \in [7.25, 9.25]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-5.67, -1.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-11.2, 0.8]$ and $b \in [-10.6, -0.6]$

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.

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

A. $(f \circ g)(-1) \in [-0.2, 4.5]$

B. $(f \circ g)(-1) \in [-6.2, -5.4]$

C. $(f \circ g)(-1) \in [-15, -10.3]$

D. $(f \circ g)(-1) \in [-3.2, -1.6]$

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.

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

A. $f^{-1}(9) \in [-1.45, -1.25]$

B. $f^{-1}(9) \in [-2.74, -2.58]$

C. $f^{-1}(9) \in [7.52, 7.58]$

D. $f^{-1}(9) \in [-2.48, -2.4]$

E. $f^{-1}(9) \in [-2.4, -2.25]$
