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

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

A. $(f \circ g)(1) \in [-26, -23]$

B. $(f \circ g)(1) \in [10, 16]$

C. $(f \circ g)(1) \in [0, 2]$

D. $(f \circ g)(1) \in [-31, -27]$

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

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

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

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

B. $(f \circ g)(1) \in [4, 13]$

C. $(f \circ g)(1) \in [20, 21]$

D. $(f \circ g)(1) \in [-12, -10]$

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

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

$$f(x) = 3x^3 + 7x^2 + 3x + 3 \text{ and } g(x) = 6x + 8$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [4, 7]$

B. The domain is all Real numbers except $x = a$, where $a \in [4.83, 6.83]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [7.33, 11.33]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-3.2, 5.8]$ and $b \in [5.4, 7.4]$

E. The domain is all Real numbers.

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

$$f(x) = (6x + 39)^3$$

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

B. Yes, the function is 1-1.

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

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5. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -13$ and choose the interval that $f^{-1}(-13)$ belongs to.

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

A. $f^{-1}(-13) \in [1.9, 2.35]$

B. $f^{-1}(-13) \in [5.61, 6.01]$

C. $f^{-1}(-13) \in [2.8, 3.48]$

D. $f^{-1}(-13) \in [7.96, 8.38]$

E. The function is not invertible for 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. $f^{-1}(-12) \in [2.64, 2.84]$

B. $f^{-1}(-12) \in [4.45, 5.76]$

C. $f^{-1}(-12) \in [1.77, 2.56]$

D. $f^{-1}(-12) \in [0.92, 1.55]$

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

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

$$f(x) = (6x + 34)^3$$

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 there is a y-value that goes to 2 different x-values.

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

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

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

$$f(x) = e^{x-4} - 3$$

A. $f^{-1}(9) \in [-1.24, -1.19]$

B. $f^{-1}(9) \in [-1.55, -1.48]$

C. $f^{-1}(9) \in [-0.48, -0.33]$

D. $f^{-1}(9) \in [-1.48, -1.36]$

E. $f^{-1}(9) \in [6.48, 6.58]$

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

$$f(x) = 8x + 9 \text{ and } g(x) = 3x^3 + 4x^2 + 6x + 4$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-2.4, 10.6]$

B. The domain is all Real numbers except $x = a$, where $a \in [-7.83, 0.17]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [2.5, 8.5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [1.67, 10.67]$ and $b \in [-14.2, -2.2]$

E. The domain is all Real numbers.

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

$$f(x) = e^{x+3} + 5$$

A. $f^{-1}(8) \in [7.46, 7.6]$

B. $f^{-1}(8) \in [4.07, 4.19]$

C. $f^{-1}(8) \in [7.3, 7.44]$

D. $f^{-1}(8) \in [6.44, 6.65]$

E. $f^{-1}(8) \in [-2.12, -1.87]$
