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

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

A. $(f \circ g)(-1) \in [-13, -7]$

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

C. $(f \circ g)(-1) \in [-6, -4]$

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

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.

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

A. $(f \circ g)(1) \in [-12, -9]$

B. $(f \circ g)(1) \in [-23, -15]$

C. $(f \circ g)(1) \in [3, 8]$

D. $(f \circ g)(1) \in [-2, 3]$

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

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

$$f(x) = 4x^4 + 7x^3 + 2x^2 + 7 \text{ and } g(x) = 3x^4 + 9x^3 + x^2 + 4x + 5$$

A. The domain is all Real numbers except $x = a,$ where $a \in [-7.8, 1.2]$

B. The domain is all Real numbers less than or equal to $x = a,$ where $a \in [-2.2, 4.8]$

C. The domain is all Real numbers greater than or equal to $x = a,$ where $a \in [-9.67, 4.33]$

D. The domain is all Real numbers except $x = a$ and $x = b,$ where $a \in [-8.4, -1.4]$ and $b \in [3.33, 9.33]$

E. The domain is all Real numbers.

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

$$f(x) = (3x + 14)^3$$

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

B. Yes, the function is 1-1.

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

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

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

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5. 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.

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

A. $f^{-1}(10) \in [4.08, 4.2]$

B. $f^{-1}(10) \in [1.76, 1.96]$

C. $f^{-1}(10) \in [2, 2.2]$

D. $f^{-1}(10) \in [1.1, 1.13]$

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 $x = -15$ and choose the interval the $f^{-1}(-15)$ belongs to.

$$f(x) = \sqrt[3]{4x + 5}$$

A. $f^{-1}(-15) \in [-843.34, -841.99]$

B. $f^{-1}(-15) \in [-845.3, -844.73]$

C. $f^{-1}(-15) \in [843.94, 846.01]$

D. $f^{-1}(-15) \in [842.15, 843.44]$

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

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

$$f(x) = (6x - 19)^3$$

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

D. Yes, the function is 1-1.

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

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

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

A. $f^{-1}(7) \in [8097.3, 8103.4]$

B. $f^{-1}(7) \in [59874.5, 59878.1]$

C. $f^{-1}(7) \in [21.5, 26.5]$

D. $f^{-1}(7) \in [59871.2, 59872.5]$

E. $f^{-1}(7) \in [141.8, 145.4]$

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

$$f(x) = \sqrt{6x - 42} \text{ and } g(x) = 5x + 4$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [0.8, 5.8]$

B. The domain is all Real numbers except $x = a$, where $a \in [3.33, 13.33]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [1, 9]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [6.25, 9.25]$ and $b \in [6.67, 9.67]$

E. The domain is all Real numbers.

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

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

A. $f^{-1}(7) \in [-1.75, -1.29]$

B. $f^{-1}(7) \in [-1.04, -0.1]$

C. $f^{-1}(7) \in [-1.75, -1.29]$

D. $f^{-1}(7) \in [5.24, 6.53]$

E. $f^{-1}(7) \in [-1.04, -0.1]$
