1. 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.

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

A. $f^{-1}(10) \in [1.98, 2.31]$

B. $f^{-1}(10) \in [3.1, 3.42]$

C. $f^{-1}(10) \in [3.43, 4.59]$

D. $f^{-1}(10) \in [1.18, 1.51]$

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

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

$$f(x) = 2x^4 + 5x^3 + 7x^2 + 5x + 8 \text{ and } g(x) = \sqrt{-5x - 18}$$

A. The domain is all Real numbers except $x = a$, where $a \in [-9.2, -2.2]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-4.6, -1.6]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-7, 3]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [4.8, 7.8]$ and $b \in [4.6, 7.6]$

E. The domain is all Real numbers.

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

$$f(x) = \sqrt{5x - 31}$$

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. 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 $x = 9$ and choose the interval that $f^{-1}(9)$ belongs to.

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

A. $f^{-1}(9) \in [7.36, 7.62]$

B. $f^{-1}(9) \in [-2.73, -2.58]$

C. $f^{-1}(9) \in [5.01, 5.74]$

D. $f^{-1}(9) \in [7.59, 7.68]$

E. $f^{-1}(9) \in [6.57, 7.46]$

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

$$f(x) = e^{x+5} + 2$$

A. $f^{-1}(7) \in [5.44, 7.75]$

B. $f^{-1}(7) \in [-4.57, -3.11]$

C. $f^{-1}(7) \in [4.44, 4.74]$

D. $f^{-1}(7) \in [3.99, 4.23]$

E. $f^{-1}(7) \in [1.65, 3.06]$

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

$$f(x) = \sqrt{6x - 38}$$

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

$$f(x) = 9x^3 + 6x^2 + 5x + 8 \text{ and } g(x) = \sqrt{4x - 30}$$

A. The domain is all Real numbers except $x = a$, where $a \in [-4.25, 9.75]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [4.5, 14.5]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [3.8, 6.8]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [5.4, 6.4]$ and $b \in [-8.8, 0.2]$

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.

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

A. $(f \circ g)(1) \in [-11.4, -7.3]$

B. $(f \circ g)(1) \in [-7.6, -4.8]$

C. $(f \circ g)(1) \in [-1.7, 4.1]$

D. $(f \circ g)(1) \in [-5.5, -2.9]$

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.

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

A. $(f \circ g)(-1) \in [8.9, 14.2]$

B. $(f \circ g)(-1) \in [-3.2, -0.6]$

C. $(f \circ g)(-1) \in [-1.5, 2.9]$

D. $(f \circ g)(-1) \in [-13.8, -11.2]$

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 $x = 10$ and choose the interval the $f^{-1}(10)$ belongs to.

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

A. $f^{-1}(10) \in [-331.67, -324.67]$

B. $f^{-1}(10) \in [-337, -332]$

C. $f^{-1}(10) \in [332, 338]$

D. $f^{-1}(10) \in [326.67, 334.67]$

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