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

$$f(x) = x^4 + 8x^3 + 3x^2 + 5x + 1 \text{ and } g(x) = 7x^4 + 7x^3 + 5x^2 + 3$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-10, 1]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-7.67, 1.33]$

C. The domain is all Real numbers except $x = a$, where $a \in [-11.2, -2.2]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-7.6, -0.6]$ and $b \in [-10.67, 2.33]$

E. The domain is all Real numbers.

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

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

A. $f^{-1}(12) \in [-431.95, -429.73]$

B. $f^{-1}(12) \in [431.69, 433.5]$

C. $f^{-1}(12) \in [-434.68, -431.75]$

D. $f^{-1}(12) \in [430.68, 431.77]$

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

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

$$f(x) = 36x^2 - 252x + 441$$

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

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

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

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 (if it exists). Then, evaluate the inverse at $x = 14$ and choose the interval that $f^{-1}(14)$ belongs to.

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

A. $f^{-1}(14) \in [1.54, 1.89]$

B. $f^{-1}(14) \in [1.9, 2.03]$

C. $f^{-1}(14) \in [5.68, 5.84]$

D. $f^{-1}(14) \in [3.34, 3.92]$

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

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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.

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

A. $f^{-1}(9) \in [5.8, 7]$

B. $f^{-1}(9) \in [6.9, 9.7]$

C. $f^{-1}(9) \in [5.8, 7]$

D. $f^{-1}(9) \in [6.9, 9.7]$

E. $f^{-1}(9) \in [-4.6, -3.5]$

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

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

A. $(f \circ g)(1) \in [14, 21]$

B. $(f \circ g)(1) \in [12, 13]$

C. $(f \circ g)(1) \in [4, 9]$

D. $(f \circ g)(1) \in [12, 13]$

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

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

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

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

B. $(f \circ g)(-1) \in [-67, -58]$

C. $(f \circ g)(-1) \in [-76, -70]$

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

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

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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.

$$f(x) = \ln(x - 5) - 5$$

A. $f^{-1}(7) \in [162747.79, 162753.79]$

B. $f^{-1}(7) \in [10.39, 14.39]$

C. $f^{-1}(7) \in [162757.79, 162762.79]$

D. $f^{-1}(7) \in [-1.61, 3.39]$

E. $f^{-1}(7) \in [162747.79, 162753.79]$

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

$$f(x) = \frac{2}{5x + 31} \text{ and } g(x) = 2x^4 + 8x^2 + 8x + 7$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-5.4, 0.6]$

B. The domain is all Real numbers except $x = a$, where $a \in [-9.2, -5.2]$

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 $a \in [-10.2, -2.2]$ and $b \in [-5.8, -4.8]$

E. The domain is all Real numbers.

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

$$f(x) = \sqrt{-5x + 19}$$

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

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

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

D. Yes, the function is 1-1.

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