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

$$f(x) = \sqrt{-5x + 18} \text{ and } g(x) = 8x^4 + 5x^3 + 3x^2 + 9x + 5$$

A. The domain is all Real numbers except $x = a$, where $a \in [0.4, 8.4]$

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

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-7.75, 1.25]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-8.4, -2.4]$ and $b \in [1.83, 8.83]$

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

$$f(x) = \sqrt[3]{2x + 4}$$

A. $f^{-1}(-10) \in [501.5, 506.2]$

B. $f^{-1}(-10) \in [496.7, 498.8]$

C. $f^{-1}(-10) \in [-503, -499.6]$

D. $f^{-1}(-10) \in [-500.5, -497.4]$

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

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

$$f(x) = -18x^2 + 93x + 870$$

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

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. Yes, the function is 1-1.

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

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4. 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.

$$f(x) = \sqrt[3]{2x + 4}$$

A. $f^{-1}(10) \in [501.1, 505.8]$

B. $f^{-1}(10) \in [-504.2, -498.6]$

C. $f^{-1}(10) \in [-498.9, -495.7]$

D. $f^{-1}(10) \in [495.5, 500.2]$

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.

$$f(x) = \ln(x - 4) + 5$$

A. $f^{-1}(9) \in [442412.39, 442427.39]$

B. $f^{-1}(9) \in [56.6, 60.6]$

C. $f^{-1}(9) \in [45.6, 55.6]$

D. $f^{-1}(9) \in [152.41, 155.41]$

E. $f^{-1}(9) \in [1202605.28, 1202611.28]$

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

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

A. $(f \circ g)(-1) \in [-15, -9]$

B. $(f \circ g)(-1) \in [3, 9]$

C. $(f \circ g)(-1) \in [14, 15]$

D. $(f \circ g)(-1) \in [-21, -15]$

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.

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

A. $(f \circ g)(-1) \in [19, 27]$

B. $(f \circ g)(-1) \in [-73, -65]$

C. $(f \circ g)(-1) \in [28, 32]$

D. $(f \circ g)(-1) \in [-66, -56]$

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.

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

A. $f^{-1}(7) \in [4.31, 4.6]$

B. $f^{-1}(7) \in [-3.01, -2.63]$

C. $f^{-1}(7) \in [-3.43, -3.34]$

D. $f^{-1}(7) \in [0.43, 0.88]$

E. $f^{-1}(7) \in [-4.6, -4.26]$

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

$$f(x) = \sqrt{-5x - 27} \text{ and } g(x) = 2x^2$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-10.4, 0.6]$

B. The domain is all Real numbers except $x = a$, where $a \in [-10.25, -5.25]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-9, -2]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-8.8, -4.8]$ and $b \in [-3.8, 0.2]$

E. The domain is all Real numbers.

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

$$f(x) = -24x^2 - 176x - 306$$

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

B. Yes, the function is 1-1.

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

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.
