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

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

A. $(f \circ g)(1) \in [-10.36, -9.09]$

B. $(f \circ g)(1) \in [-0.68, 1.48]$

C. $(f \circ g)(1) \in [-6.93, -4.27]$

D. $(f \circ g)(1) \in [-2.19, -1.23]$

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

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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 that $f^{-1}(10)$ belongs to.

$$f(x) = 3x^2 + 2$$

A. $f^{-1}(10) \in [5.53, 5.96]$

B. $f^{-1}(10) \in [2.49, 2.74]$

C. $f^{-1}(10) \in [1.91, 2.26]$

D. $f^{-1}(10) \in [0.81, 1.76]$

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

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

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

A. $f^{-1}(14) \in [678.75, 685.75]$

B. $f^{-1}(14) \in [-688.25, -685.25]$

C. $f^{-1}(14) \in [-684.75, -681.75]$

D. $f^{-1}(14) \in [686.25, 689.25]$

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

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

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

A. $(f \circ g)(-1) \in [-63, -58]$

B. $(f \circ g)(-1) \in [-1, 8]$

C. $(f \circ g)(-1) \in [-9, -5]$

D. $(f \circ g)(-1) \in [-55, -50]$

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

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

$$f(x) = 12x^2 - 42x - 132$$

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.

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

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

A. $f^{-1}(10) \in [-2.48, -2.36]$

B. $f^{-1}(10) \in [6.48, 6.81]$

C. $f^{-1}(10) \in [-3.33, -2.99]$

D. $f^{-1}(10) \in [-1.51, -1.22]$

E. $f^{-1}(10) \in [-3.43, -3.32]$

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

$$f(x) = e^{x+2} - 4$$

A. $f^{-1}(8) \in [-2.56, -2.18]$

B. $f^{-1}(8) \in [-0.28, 0.99]$

C. $f^{-1}(8) \in [3.2, 6.23]$

D. $f^{-1}(8) \in [-4.9, -2.33]$

E. $f^{-1}(8) \in [-2.12, -0.75]$

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

$$f(x) = \sqrt{5x - 25} \text{ and } g(x) = 9x^3 + 8x^2 + 7x + 8$$

A. The domain is all Real numbers except $x = a$, where $a \in [4.25, 9.25]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-5.33, 3.67]$

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 $a \in [-8.83, -1.83]$ and $b \in [-7.25, -3.25]$

E. The domain is all Real numbers.

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

$$f(x) = \sqrt{-4x - 15}$$

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

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

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

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

E. Yes, the function is 1-1.

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

$$f(x) = 8x^2 + 5x + 4 \text{ and } g(x) = \sqrt{6x - 27}$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [4.5, 6.5]$

B. The domain is all Real numbers except $x = a$, where $a \in [4.4, 9.4]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-10.75, 1.25]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-9.17, 1.83]$ and $b \in [-6.2, 5.8]$

E. The domain is all Real numbers.
