1. Find the inverse of the function below. Then, evaluate the inverse at $x = 9$ and choose the interval that $f^{-1}(9)$ belongs to.

$$f(x) = e^{x+5} + 3$$

A. $f^{-1}(9) \in [6.47, 6.96]$

B. $f^{-1}(9) \in [5.45, 5.55]$

C. $f^{-1}(9) \in [-3.54, -3.01]$

D. $f^{-1}(9) \in [4.28, 4.77]$

E. $f^{-1}(9) \in [5.59, 5.99]$

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

$$f(x) = \frac{4}{4x+23} \text{ and } g(x) = \frac{2}{3x+11}$$

A. The domain is all Real numbers except $x = a$, where $a \in [-8, -3]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-8, 0]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [1, 7]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-7, -5]$ and $b \in [-4, 5]$

E. The domain is all Real numbers.

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3. 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.

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

A. $f^{-1}(10) \in [1.41, 1.58]$

B. $f^{-1}(10) \in [0.84, 1.45]$

C. $f^{-1}(10) \in [5.08, 5.58]$

D. $f^{-1}(10) \in [4.12, 4.6]$

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

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

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

A. $(f \circ g)(1) \in [55, 69]$

B. $(f \circ g)(1) \in [15, 19]$

C. $(f \circ g)(1) \in [3, 14]$

D. $(f \circ g)(1) \in [71, 76]$

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

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

$$f(x) = 36x^2 - 264x + 484$$

A. Yes, the function is 1-1.

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

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

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

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