1. Choose the interval below that f composed with g at $x = -2$ is in.

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

A. $(f \circ g)(-2) \in [13, 21]$

B. $(f \circ g)(-2) \in [9, 17]$

C. $(f \circ g)(-2) \in [1, 3]$

D. $(f \circ g)(-2) \in [-3, -1]$

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

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

$$f(x) = -9x^2 - 75x - 136$$

A. Yes, the function is 1-1.

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

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 there is a y-value that goes to 2 different x-values.

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

$$f(x) = 16x^2 + 112x + 196$$

A. Yes, the function is 1-1.

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

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

$$f(x) = \frac{2}{6x + 31} \text{ and } g(x) = \frac{5}{5x + 24}$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [5, 9]$

B. The domain is all Real numbers except $x = a$, where $a \in [-7.75, 1.25]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-6.67, -2.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-11.17, -3.17]$ and $b \in [-6.8, -2.8]$

E. The domain is all Real numbers.

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

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

A. $f^{-1}(8) \in [-2.04, -1.82]$

B. $f^{-1}(8) \in [7.42, 7.68]$

C. $f^{-1}(8) \in [7.24, 7.41]$

D. $f^{-1}(8) \in [3.93, 4.35]$

E. $f^{-1}(8) \in [6.48, 6.61]$

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

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

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

B. $(f \circ g)(-1) \in [4, 12]$

C. $(f \circ g)(-1) \in [-10, -2]$

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

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

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

$$f(x) = \ln(x - 2) + 4$$

A. $f^{-1}(6) \in [22027.47, 22032.47]$

B. $f^{-1}(6) \in [8.39, 13.39]$

C. $f^{-1}(6) \in [2982.96, 2986.96]$

D. $f^{-1}(6) \in [53.6, 59.6]$

E. $f^{-1}(6) \in [-1.61, 8.39]$

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8. 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.

$$f(x) = 5x^2 + 3$$

A. $f^{-1}(14) \in [1.82, 1.88]$

B. $f^{-1}(14) \in [7.27, 7.53]$

C. $f^{-1}(14) \in [4.19, 4.63]$

D. $f^{-1}(14) \in [1.11, 1.71]$

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

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9. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^{-1}(-15)$ belongs to.

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

A. $f^{-1}(-15) \in [6.54, 7.25]$

B. $f^{-1}(-15) \in [4.53, 5.15]$

C. $f^{-1}(-15) \in [1.27, 1.96]$

D. $f^{-1}(-15) \in [1.81, 2.37]$

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

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

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

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-2.6, 0.4]$

B. The domain is all Real numbers except $x = a$, where $a \in [-9.2, -0.2]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-0.5, 6.5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-6.6, -0.6]$ and $b \in [-8.2, -5.2]$

E. The domain is all Real numbers.
