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

$$f(x) = 4x^2 - 5$$

A. $f^{-1}(-12) \in [2.15, 3.38]$

B. $f^{-1}(-12) \in [1.31, 1.64]$

C. $f^{-1}(-12) \in [5.6, 7.09]$

D. $f^{-1}(-12) \in [1.78, 2.28]$

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

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

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

A. $(f \circ g)(-1) \in [0, 4]$

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

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

D. $(f \circ g)(-1) \in [-13, -9]$

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

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

$$f(x) = e^{x+3} + 2$$

A. $f^{-1}(8) \in [4.35, 4.46]$

B. $f^{-1}(8) \in [4.53, 4.96]$

C. $f^{-1}(8) \in [3.57, 3.73]$

D. $f^{-1}(8) \in [4.25, 4.31]$

E. $f^{-1}(8) \in [-1.3, -1.13]$

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

$$f(x) = \sqrt{4x - 16}$$

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

B. Yes, the function is 1-1.

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

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

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

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

$$f(x) = -12x^2 + 11x + 56$$

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

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

C. Yes, the function is 1-1.

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

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

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

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

A. $(f \circ g)(-1) \in [31, 36]$

B. $(f \circ g)(-1) \in [21, 27]$

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

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

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

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

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

A. $f^{-1}(-15) \in [-674.97, -673.41]$

B. $f^{-1}(-15) \in [673.81, 675.29]$

C. $f^{-1}(-15) \in [-677.11, -675.68]$

D. $f^{-1}(-15) \in [675.31, 676.63]$

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

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

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

A. $f^{-1}(9) \in [59875.14, 59882.14]$

B. $f^{-1}(9) \in [442414.39, 442417.39]$

C. $f^{-1}(9) \in [1096.63, 1103.63]$

D. $f^{-1}(9) \in [144.41, 155.41]$

E. $f^{-1}(9) \in [1087.63, 1093.63]$

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

$$f(x) = 9x^3 + x^2 + 5x + 7 \text{ and } g(x) = \sqrt{6x + 36}$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [1, 4]$

B. The domain is all Real numbers except $x = a$, where $a \in [1.8, 7.8]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-6, -4]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-0.4, 6.6]$ and $b \in [4.33, 9.33]$

E. The domain is all Real numbers.

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

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

A. The domain is all Real numbers except $x = a$, where $a \in [1.33, 6.33]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-7.2, -3.2]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [7.33, 9.33]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-6.25, 5.75]$ and $b \in [-11.8, -1.8]$

E. The domain is all Real numbers.
