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

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

   A. $(f \circ g)(-1) \in [-11, -5]$
   B. $(f \circ g)(-1) \in [75, 79]$
   C. $(f \circ g)(-1) \in [81, 90]$
   D. $(f \circ g)(-1) \in [-5, 0]$
   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 $x = -15$ and choose the interval the $f^{-1}(-15)$ belongs to.

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

   A. $f^{-1}(-15) \in [-1128.5, -1124.9]$
   B. $f^{-1}(-15) \in [-1124.7, -1122.4]$
   C. $f^{-1}(-15) \in [1122.2, 1125.6]$
   D. $f^{-1}(-15) \in [1124.6, 1127.9]$
   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 $x = -10$ and choose the interval that $f^{-1}(-10)$ belongs to.

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

   A. $f^{-1}(-10) \in [1.58, 2.34]$
   B. $f^{-1}(-10) \in [2.26, 2.49]$
   C. $f^{-1}(-10) \in [4.29, 5.04]$
   D. $f^{-1}(-10) \in [1.22, 1.62]$
   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.

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

   A. $(f \circ g)(-1) \in [9, 20]$
   B. $(f \circ g)(-1) \in [-15, -9]$
   C. $(f \circ g)(-1) \in [-4, 0]$
   D. $(f \circ g)(-1) \in [4, 9]$
   E. It is not possible to compose the two functions.

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

$$f(x) = -24x^2 - 270x - 729$$

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

$$f(x) = \ln(x + 3) - 2$$

   A. $f^{-1}(5) \in [1090.63, 1097.63]$
   B. $f^{-1}(5) \in [3.39, 6.39]$
   C. $f^{-1}(5) \in [1097.63, 1106.63]$
   D. $f^{-1}(5) \in [2977.96, 2983.96]$
   E. $f^{-1}(5) \in [15.09, 18.09]$

7. 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. $f^{-1}(9) \in [1202596.28, 1202605.28]$

B. $f^{-1}(9) \in [1202604.28, 1202609.28]$

C. $f^{-1}(9) \in [141.41, 144.41]$

D. $f^{-1}(9) \in [442408.39, 442416.39]$

E. $f^{-1}(9) \in [55.6, 61.6]$

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

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

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-8, -2]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [2.33, 3.33]$

C. The domain is all Real numbers except $x = a$, where $a \in [1.75, 6.75]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [4.2, 10.2]$ and $b \in [-7.17, -4.17]$

E. The domain is all Real numbers.

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

$$f(x) = (5x - 23)^3$$

A. Yes, the function is 1-1.

B. No, because the range 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 domain 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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10. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = x + 3 \text{ and } g(x) = 6x + 7$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-10, -5]$

B. The domain is all Real numbers except $x = a$, where $a \in [-5.67, -2.67]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-5.33, -0.33]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [4.6, 11.6]$ and $b \in [6.2, 11.2]$

E. The domain is all Real numbers.
