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

$$f(x) = 9x^2 + 15x - 456$$

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

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 the domain of the function is not $(-\infty, \infty)$.

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

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

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

A. $(f \circ g)(-1) \in [2, 8]$

B. $(f \circ g)(-1) \in [-67, -61]$

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

D. $(f \circ g)(-1) \in [-83, -73]$

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

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

$$f(x) = x^4 + 5x^3 + 5x^2 + 2 \text{ and } g(x) = \frac{5}{4x + 15}$$

A. The domain is all Real numbers except $x = a,$ where $a \in [-3.75, 0.25]$

B. The domain is all Real numbers greater than or equal to $x = a,$ where $a \in [-9.25, -2.25]$

C. The domain is all Real numbers less than or equal to $x = a,$ where $a \in [-2, 0]$

D. The domain is all Real numbers except $x = a$ and $x = b,$ where $a \in [-8.33, 1.67]$ and $b \in [6.2, 7.2]$

E. The domain is all Real numbers.

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

$$f(x) = e^{x-4} - 3$$

A. $f^{-1}(9) \in [-1.36, -1.19]$

B. $f^{-1}(9) \in [-0.61, -0.43]$

C. $f^{-1}(9) \in [-1.43, -1.22]$

D. $f^{-1}(9) \in [-1.76, -1.5]$

E. $f^{-1}(9) \in [6.36, 6.51]$

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5. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -11$ and choose the interval the $f^{-1}(-11)$ belongs to.

$$f(x) = \sqrt[3]{2x - 3}$$

A. $f^{-1}(-11) \in [663.1, 665.4]$

B. $f^{-1}(-11) \in [-668.4, -665.4]$

C. $f^{-1}(-11) \in [-665.8, -660.6]$

D. $f^{-1}(-11) \in [666.8, 669.9]$

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

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

$$f(x) = \frac{5}{3x - 16} \text{ and } g(x) = \frac{3}{4x + 21}$$

A. The domain is all Real numbers except $x = a$, where $a \in [4.33, 12.33]$

B. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-5.67, 2.33]$

C. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [3.75, 7.75]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [4.33, 7.33]$ and $b \in [-9.25, -3.25]$

E. The domain is all Real numbers.

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

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

A. $(f \circ g)(-1) \in [-79, -74]$

B. $(f \circ g)(-1) \in [-68, -67]$

C. $(f \circ g)(-1) \in [51, 55]$

D. $(f \circ g)(-1) \in [39, 48]$

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

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

$$f(x) = \sqrt[3]{3x + 2}$$

A. $f^{-1}(10) \in [-334.41, -333.58]$

B. $f^{-1}(10) \in [332.26, 333.46]$

C. $f^{-1}(10) \in [333.98, 334.06]$

D. $f^{-1}(10) \in [-333.03, -332.01]$

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

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

$$f(x) = e^{x-2} + 5$$

A. $f^{-1}(9) \in [3.15, 3.4]$

B. $f^{-1}(9) \in [7.34, 7.43]$

C. $f^{-1}(9) \in [7.59, 7.66]$

D. $f^{-1}(9) \in [6.77, 7.03]$

E. $f^{-1}(9) \in [-0.78, -0.44]$

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

$$f(x) = 36x^2 - 348x + 841$$

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

D. Yes, the function is 1-1.

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