

Inverse Function Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

What is the notation used to represent the inverse of a function (f(x))?

Hint: Think about the common notation used in mathematics for inverse functions.

A) \(f^{-1}(x) \) ✓
B) \(\frac{1}{f(x)} \)
C) \(f(x)^{-1} \)
D) \(f^2(x) \)

The correct notation for the inverse of a function is $(f^{-1}(x))$.

Which of the following statements are true about inverse functions?

Hint: Consider the properties and definitions of inverse functions.

 \square A) An inverse function reverses the operation of the original function. \checkmark

B) The inverse of a function is always a function.

□ C) \(f(f^{-1}(x)) = x \) for all \(x \) in the domain of \(f^{-1} \). \checkmark

 \Box D) The graph of an inverse function is a reflection over the line \(y = x \). \checkmark

An inverse function reverses the operation of the original function, and the graph of an inverse function is a reflection over the line (y = x).

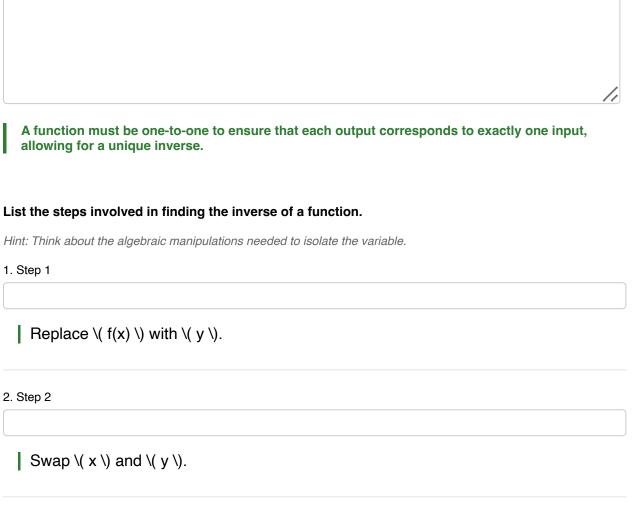
Explain why a function must be one-to-one to have an inverse.

Hint: Consider the definition of one-to-one functions and their implications for inverses.

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3. Step 3

Solve for (y).

The steps typically include replacing (f(x)) with (y), swapping (x) and (y), and solving for (y).

Which test can be used to determine if a function is one-to-one?

Hint: Think about the graphical tests used in calculus.

A) Vertical line test

○ B) Horizontal line test ✓



○ C) Diagonal line test

D) Symmetry test

The horizontal line test can be used to determine if a function is one-to-one.

Part 2: Comprehension and Application

If the function (f(x) = 3x + 5), what is the first step in finding its inverse?

Hint: Consider how to manipulate the equation to isolate (x).

- \bigcirc A) Add 5 to both sides
- B) Subtract 5 from both sides ✓
- O C) Divide by 3
- O D) Multiply by 3
- The first step is to subtract 5 from both sides of the equation.

Which of the following are true about the domain and range of a function and its inverse?

Hint: Think about how the domain and range relate to each other.

 \square A) The domain of the original function becomes the range of the inverse. \checkmark

- igsquire B) The range of the original function becomes the domain of the inverse. \checkmark
- C) They remain unchanged.
- D) They are unrelated.
- The domain of the original function becomes the range of the inverse, and vice versa.

Describe how the graph of a function and its inverse are related.

Hint: Consider the geometric relationship between the two graphs.



The graph of a function and its inverse are reflections of each other across the line (y = x).

Given the function (f(x) = 2x - 4), what is the inverse function $(f^{-1}(x))?$

Hint: Think about how to manipulate the equation to find the inverse.

The inverse function is $(f^{-1}(x) = \frac{x + 4}{2})$.

Find the inverse of the function $(f(x) = \frac{x - 1}{x + 1})$.

Hint: Consider how to manipulate the equation to isolate (x).

To find the inverse, set $(y = \frac{x - 1}{x + 1})$ and solve for (x).

Part 3: Analysis, Evaluation, and Creation

Which of the following functions is not one-to-one and therefore does not have an inverse?

Hint: Consider the properties of the functions listed.

○ A) \(f(x) = x^3 \)
 ○ B) \(f(x) = \sqrt{x} \)
 ○ C) \(f(x) = x^2 \) ✓

 \bigcirc D) \(f(x) = \ln(x) \)

The function $(f(x) = x^2)$ is not one-to-one and does not have an inverse.



Analyzing the function $(f(x) = \frac{1}{x})$, which of the following statements are true?

Hint: Consider the properties of the function and its graph.

- □ A) The function is one-to-one. ✓
 □ B) The function has an inverse. ✓
- **C**) The function's graph is symmetric about the line (y = x).
- □ D) The function is not defined at (x = 0). \checkmark
- The function is one-to-one, has an inverse, and is symmetric about the line (y = x).

Analyze the function (f(x) = |x|) and explain why it does not have an inverse.

Hint: Consider the definition of one-to-one functions.

The function (f(x) = |x|) is not one-to-one because it maps both positive and negative values of (x) to the same output.

If the function (f(x) = 5x - 7) is modified to $(f(x) = 5x^2 - 7)$, what happens to its invertibility?

Hint: Consider how the modification affects the function's one-to-one property.

- \bigcirc A) It remains invertible.
- B) It becomes non-invertible. ✓
- \bigcirc C) It becomes invertible only for positive (x).
- \bigcirc D) It becomes invertible only for negative \(x \).
- The modified function $(f(x) = 5x^2 7)$ becomes non-invertible because it is not one-to-one.

Create a real-world scenario where finding the inverse of a function is necessary, and explain how you would solve it.

Hint: Think about situations where reversing a process is needed.



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An example could be calculating the original price of an item after a discount, where the inverse function would help find the original price from the discounted price.

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