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Inverse Function Worksheet Answer Key PDF

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Part 1: Building a Foundation

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

undefined. A) $f^{-1}(x)$ ✓

undefined. B) $\frac{1}{f(x)}$

undefined. C) $f(x)^{-1}$

undefined. 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?

undefined. A) An inverse function reverses the operation of the original function. ✓

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

undefined. C) $f(f^{-1}(x)) = x$ for all x in the domain of f^{-1}. ✓

undefined. D) The graph of an inverse function is a reflection over the line $y = x$. ✓

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.

A function must be one-to-one to ensure that each output corresponds to exactly one input, allowing for a unique inverse.

List the steps involved in finding the inverse of a function.

1. Step 1

Replace $f(x)$ with y.

2. Step 2

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Swap \(x \) and \(y \).

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?

undefined. A) Vertical line test

undefined. B) Horizontal line test ✓

undefined. C) Diagonal line test

undefined. 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?

undefined. A) Add 5 to both sides

undefined. B) Subtract 5 from both sides ✓

undefined. C) Divide by 3

undefined. 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?

undefined. A) The domain of the original function becomes the range of the inverse. ✓

undefined. B) The range of the original function becomes the domain of the inverse. ✓

undefined. C) They remain unchanged.

undefined. 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.

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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 $f^{-1}(x)$?

undefined. A) $f^{-1}(x) = \frac{x + 4}{2}$ ✓

undefined. B) $f^{-1}(x) = \frac{x - 4}{2}$

undefined. C) $f^{-1}(x) = 2x + 4$

undefined. D) $f^{-1}(x) = 2x - 4$

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

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

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?

undefined. A) $f(x) = x^3$

undefined. B) $f(x) = \sqrt{x}$

undefined. C) $f(x) = x^2$ ✓

undefined. 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?

undefined. A) The function is one-to-one. ✓

undefined. B) The function has an inverse. ✓

undefined. C) The function's graph is symmetric about the line $y = x$. ✓

undefined. D) The function is not defined at $x = 0$. ✓

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.

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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?

undefined. A) It remains invertible.

undefined. B) It becomes non-invertible. ✓

undefined. C) It becomes invertible only for positive x.

undefined. 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.

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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