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Functions And Inverses Worksheet Answer Key PDF

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Part 1: Building a Foundation

What is the definition of a function?

undefined. A) A relation where each input is related to exactly one output ✓

undefined. B) A relation where each input is related to multiple outputs

undefined. C) A set of ordered pairs

undefined. D) A process of finding the derivative

A function is defined as a relation where each input is related to exactly one output.

Which of the following are properties of a one-to-one function?

undefined. A) Each input has a unique output ✓

undefined. B) The function passes the vertical line test

undefined. C) The function passes the horizontal line test ✓

undefined. D) Every output is mapped from at least one input

A one-to-one function has unique outputs for each input and passes the horizontal line test.

Explain what an inverse function is and how it relates to the original function.

An inverse function reverses the mapping of the original function, such that if f(x) = y, then f^-1(y) = x.

List two conditions that must be met for a function to have an inverse.

1. Condition 1

The function must be one-to-one.

2. Condition 2

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The function must be onto.

A function must be one-to-one and onto to have an inverse.

What is the notation used to denote the inverse of a function f?

undefined. A) f^2

undefined. B) f^-1 ✓

undefined. C) f'

undefined. D) f^(-1)

The notation for the inverse of a function f is f^-1.

Part 2: Understanding and Interpretation

Which test can be used to determine if a function has an inverse?

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 has an inverse.

If a function is bijective, which of the following statements are true?

undefined. A) It is both one-to-one and onto ✓

undefined. B) It has an inverse ✓

undefined. C) It is only one-to-one

undefined. D) It is only onto

A bijective function is both one-to-one and onto, and therefore has an inverse.

Describe how the domain and range of a function relate to the domain and range of its inverse.

The domain of the original function becomes the range of the inverse, and the range of the original function becomes the domain of the inverse.

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Part 3: Application and Analysis

Given the function f(x) = 2x + 3, what is the inverse function f^(-1)(x)?

undefined. A) (x - 3)/2 ✔

undefined. B) 2x - 3

undefined. C) x/2 + 3

undefined. D) 2(x - 3)

The inverse function is f^(-1)(x) = (x - 3)/2.

Which of the following functions have inverses?

undefined. A) f(x) = x^2, x ≥ 0 ✔

undefined. B) f(x) = x^3 ✔

undefined. C) f(x) = |x|

undefined. D) f(x) = 2x + 1 ✔

The functions f(x) = x^2 (x ≥ 0), f(x) = x^3, and f(x) = 2x + 1 have inverses, while f(x) = |x| does not.

Find the inverse of the function f(x) = (x - 5)^2, x ≥ 5, and explain your steps.

The inverse is f^(-1)(x) = √x + 5, found by reversing the squaring operation.

Which of the following graphs represents a function that has an inverse?

undefined. A) A parabola opening upwards

undefined. B) A straight line ✔

undefined. C) A circle

undefined. D) A hyperbola

A straight line represents a function that has an inverse.

Analyze the function f(x) = 3x - 4. Which of the following statements are true about its inverse?

undefined. A) The inverse is also a linear function ✔

undefined. B) The inverse will have a slope of 1/3

undefined. C) The inverse is not defined

undefined. D) The inverse will have a y-intercept of 4/3

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The inverse is also a linear function and will have a slope of 1/3.

Analyze the relationship between a function and its inverse graphically. How do their graphs relate to each other on the coordinate plane?

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

Part 4: Evaluation and Creation

If a function f(x) = ax + b is not one-to-one, what can be concluded about its inverse?

undefined. A) The inverse does not exist ✓

undefined. B) The inverse is the same as the function

undefined. C) The inverse is a quadratic function

undefined. D) The inverse is undefined

If a function is not one-to-one, its inverse does not exist.

Evaluate the following statements about inverse functions. Which are correct?

undefined. A) The inverse of a function always exists

undefined. B) The inverse of a bijective function is unique ✓

undefined. C) Inverses are only defined for linear functions

undefined. D) The inverse of an inverse function is the original function ✓

The inverse of a bijective function is unique, but not all functions have inverses.

Create a real-world scenario where finding the inverse of a function is necessary. Explain the context and the solution.

An example could be calculating the original price of an item after a discount is applied, requiring the inverse of the discount function.

Propose two different functions and describe how you would determine if they have inverses. Provide a brief explanation for each.

1. Function 1

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f(x) = x + 1, which is one-to-one.

2. Function 2

f(x) = x^2, which is not one-to-one.

To determine if a function has an inverse, check if it is one-to-one and onto.

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