

Relations And Functions Worksheet

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Part 1: Building a Foundation

What is a function?

Hint: Think about the relationship between inputs and outputs.

- A) A set of ordered pairs where each input is related to multiple outputs.
- B) A set of ordered pairs where each input is related to exactly one output.
- C) A graph that forms a circle.
- D) A mathematical operation involving addition.

What is a function?

Hint: Think about the definition of a function in mathematics.

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- B) A set of ordered pairs where each input is related to exactly one output.
- C) A graph that forms a circle.
- D) A mathematical operation involving addition.

Which of the following are characteristics of a function? (Select all that apply)

Hint: Consider the properties that define a function.

- A) Each input has exactly one output.
- B) It can have multiple outputs for a single input.
- C) It passes the vertical line test.
- D) It can be represented by a set of ordered pairs.

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Define the domain and range of a function in your own words.

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List two types of functions and provide a brief description of each.

Hint: Consider different categories of functions.

1. Type of function 1

2. Type of function 2

Part 2: Understanding and Interpretation

Which statements about the vertical line test are true? (Select all that apply)

Hint: Consider the purpose of the vertical line test.

- A) It is used to determine if a graph represents a function.
- B) It involves drawing horizontal lines across the graph.
- C) If a vertical line intersects the graph more than once, it is not a function.
- D) It can be used to determine the range of a function.

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Explain why the relation $\{(2, 3), (2, 4), (3, 5)\}$ is not a function.

Hint: Consider the definition of a function in terms of input-output pairs.

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Part 3: Application and Analysis

Given the function $f(x) = 2x + 3$, what is $f(4)$?

Hint: Substitute 4 into the function and calculate.

- A) 8
- B) 11
- C) 10
- D) 7

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Hint: Substitute 4 into the function and calculate the result.

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Which of the following are linear functions? (Select all that apply)

Hint: Identify functions that graph to straight lines.

- A) $f(x) = 3x + 2$
- B) $f(x) = x^2 + 5$
- C) $f(x) = 7 - x$
- D) $f(x) = 2^x$

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Hint: Identify functions that can be represented by a straight line.

- A) $f(x) = 3x + 2$
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- C) $f(x) = 7 - x$
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Calculate the range of the function $f(x) = x^2$ for the domain $\{1, 2, 3\}$.

Hint: Evaluate the function at each value in the domain.

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Which of the following statements is true about inverse functions?

Hint: Consider the properties of inverse functions.

- A) An inverse function always exists for every function.
- B) The inverse of a function is found by swapping the domain and range.
- C) Inverse functions are always linear.
- D) The inverse of a function is found by adding a constant to the function.

Analyze the following functions and determine which have inverses. (Select all that apply)

Hint: Consider the properties that allow a function to have an inverse.

- A) $f(x) = x + 3$
- B) $f(x) = x^2$
- C) $f(x) = 1/x$
- D) $f(x) = x^3$

Describe how you would determine if a given function has an inverse.

Hint: Think about the tests you can apply to a function.

Part 4: Evaluation and Creation

Which of the following statements is true about inverse functions?

Hint: Consider the relationship between a function and its inverse.

- A) An inverse function always exists for every function.
- B) The inverse of a function is found by swapping the domain and range.
- C) Inverse functions are always linear.
- D) The inverse of a function is found by adding a constant to the function.

Analyze the following functions and determine which have inverses. (Select all that apply)

Hint: Consider the properties of functions that allow for inverses.

- A) $f(x) = x + 3$
- B) $f(x) = x^2$
- C) $f(x) = 1/x$
- D) $f(x) = x^3$

Describe how you would determine if a given function has an inverse.

Hint: Think about the criteria for a function to have an inverse.

Which of the following functions is most likely to model exponential growth?

Hint: Consider the characteristics of exponential functions.

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Evaluate the following scenarios and identify which could be modeled by a quadratic function. (Select all that apply)

Hint: Think about situations that involve squared relationships.

- A) The path of a projectile.
- B) The depreciation of a car's value over time.
- C) The growth of bacteria in a lab experiment.
- D) The area of a square as its side length increases.

Evaluate the following scenarios and identify which could be modeled by a quadratic function. (Select all that apply)

Hint: Think about situations that involve parabolic relationships.

- A) The path of a projectile.
- B) The depreciation of a car's value over time.
- C) The growth of bacteria in a lab experiment.
- D) The area of a square as its side length increases.

Create a real-world scenario where a function could be used to model the situation. Describe the function and explain why it is appropriate.

Hint: Think about a situation that involves relationships between quantities.

Create a real-world scenario where a function could be used to model the situation. Describe the function and explain why it is appropriate.

Hint: Think about everyday situations that can be represented mathematically.