Piecewise Function Worksheet

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Part 1: Building a Foundation

What is a piecewise function?

Hint: Think about how functions can be defined in different ways.

- ◯ A function defined by a single equation for all values of x.
- ◯ A function defined by multiple sub-functions, each applying to a specific interval of the domain.
- ◯ A function that is always continuous.
- ◯ A function that only applies to integers.

What is a piecewise function?

Hint: Think about how the function is defined.

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- ◯ A function defined by multiple sub-functions, each applying to a specific interval of the domain.
- ◯ A function that is always continuous.
- ◯ A function that only applies to integers.

How are the different pieces of a piecewise function typically written?

Hint: Consider the symbols used in mathematics to denote functions.

- ☐ Using parentheses ( )
- ☐ Using braces { }
- ☐ Using brackets [ ]
- ☐ Using inequalities

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Hint: Consider the symbols used in mathematics.

- ☐ Using parentheses ( )

- ☐ Using braces { }
- ☐ Using brackets [ ]
- ☐ Using inequalities

Describe the notation used for a piecewise function.

Hint: Think about how you would write a piecewise function mathematically.

Describe the notation used for a piecewise function.

Hint: Think about how each piece is represented.

Why might a piecewise function have a point of discontinuity?

Hint: Consider the nature of the transitions between pieces.

- ◯ Because the function is not defined at that point.
- ◯ Because the function changes from one piece to another at that point.
- ◯ Because the function is continuous everywhere.
- ◯ Because the function is linear.

Why might a piecewise function have a point of discontinuity?

Hint: Think about the behavior of the function at certain points.

- ◯ Because the function is not defined at that point.
- ◯ Because the function changes from one piece to another at that point.
- ◯ Because the function is continuous everywhere.

◯ Because the function is linear.

Part 2: Comprehension and Application

Explain how you would evaluate a piecewise function at a given point.

Hint: Think about the steps you would take to find the value of the function.

Explain how you would evaluate a piecewise function at a given point.

Hint: Consider the steps involved in the evaluation.

Which of the following scenarios could be modeled by a piecewise function?

Hint: Consider situations where different rules apply based on conditions.

- ☐ A car's speed that remains constant.
- ☐ A store's pricing that changes based on the quantity purchased.
- ☐ A temperature that remains the same throughout the day.
- ☐ A linear growth of a plant.

Which of the following scenarios could be modeled by a piecewise function?

Hint: Think about situations with different conditions.

- ☐ A car's speed that remains constant.

- [ ] A store's pricing that changes based on the quantity purchased.
- [ ] A temperature that remains the same throughout the day.
- [ ] A linear growth of a plant.

Given the piecewise function f(x) = { x^2 for x < 0, 2x + 1 for x ≥ 0 }, evaluate f(-3).

Hint: Determine which piece of the function to use for x = -3.

Given the piecewise function f(x) = { x^2 for x < 0, 2x + 1 for x ≥ 0 }, evaluate f(-3).

Hint: Use the appropriate piece for the given value.

Sketch the graph of the piecewise function f(x) = { 3x + 2 for x ≤ 1, -x + 4 for x > 1 }.

Hint: Consider how each piece behaves in its respective interval.

Sketch the graph of the piecewise function f(x) = { 3x + 2 for x ≤ 1, -x + 4 for x > 1 }.

Hint: Consider the behavior of each piece at the boundary.

Part 3: Analysis, Evaluation, and Creation

Analyze the continuity of the piecewise function f(x) = { x + 1 for x < 0, 2x for x ≥ 0 } at x = 0.

Hint: Consider the limits from both sides of x = 0.

Analyze the continuity of the piecewise function f(x) = { x + 1 for x < 0, 2x for x ≥ 0 } at x = 0.

Hint: Consider the limits from both sides.

Compare the graphs of the piecewise functions f(x) = { x^2 for x < 1, 2x for x ≥ 1 } and g(x) = { x^2 for x < 1, 2x + 1 for x ≥ 1 }.

Hint: Look for differences in the behavior of the functions at x = 1.

Compare the graphs of the piecewise functions f(x) = { x^2 for x < 1, 2x for x ≥ 1 } and g(x) = { x^2 for x < 1, 2x + 1 for x ≥ 1 }.

Hint: Look for differences in behavior at the boundary.

Evaluate the effectiveness of using a piecewise function to model a tax system where different rates apply to different income brackets.

Hint: Consider the advantages and disadvantages.

Evaluate the effectiveness of using a piecewise function to model a tax system where different rates apply to different income brackets.

Hint: Consider the advantages and disadvantages of this approach.

Create a piecewise function to model a scenario where a parking fee is $5 for the first hour and $3 for each additional hour.

Hint: Define the conditions for each piece.

Create a piecewise function to model a scenario where a parking fee is $5 for the first hour and $3 for each additional hour.

Hint: Think about how to express the different rates mathematically.

Propose a real-world situation that could be effectively modeled by a piecewise function and justify your choice.

Hint: Think about scenarios with different conditions.

Propose a real-world situation that could be effectively modeled by a piecewise function and justify your choice.

Hint: Consider scenarios with varying conditions or rates.