# Piecewise Function Worksheet Answer Key PDF

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## Part 1: Building a Foundation

### What is a piecewise function?

undefined. A function defined by a single equation for all values of x.

**undefined. A function defined by multiple sub-functions, each applying to a specific interval of the domain.** ✓

undefined. A function that is always continuous.

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A piecewise function is defined by multiple sub-functions, each applying to a specific interval of the domain.

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

undefined. Using parentheses ( )

**undefined. Using braces { }** ✓

undefined. Using brackets [ ]

undefined. Using inequalities

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

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**Describe the notation used for a piecewise function.**

**The notation for a piecewise function typically includes a set of conditions and corresponding expressions for each interval.**

**Describe the notation used for a piecewise function.**

**The notation for a piecewise function typically includes a set of conditions for each piece.**

**Why might a piecewise function have a point of discontinuity?**

undefined. Because the function is not defined at that point.

**undefined. Because the function changes from one piece to another at that point. ✓**

undefined. Because the function is continuous everywhere.

undefined. Because the function is linear.

A piecewise function may have a point of discontinuity because the function changes from one piece to another at that point.

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## Part 2: Comprehension and Application

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

**To evaluate a piecewise function at a given point, identify which interval the point falls into and then use the corresponding expression to find the value.**

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

**To evaluate a piecewise function at a given point, identify which piece applies to that point and use the corresponding expression.**

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

undefined. A car's speed that remains constant.

**undefined. A store's pricing that changes based on the quantity purchased. ✓**

undefined. A temperature that remains the same throughout the day.

undefined. A linear growth of a plant.

A store's pricing that changes based on the quantity purchased could be modeled by a piecewise function.

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undefined. A temperature that remains the same throughout the day.

undefined. A linear growth of a plant.

A store's pricing that changes based on the quantity purchased can be modeled by a piecewise function.

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

**To evaluate f(-3), use the piece x^2 since -3 is less than 0, resulting in f(-3) = 9.**

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

To evaluate f(-3), use the piece x^2 since -3 is less than 0.

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

The graph consists of a line for x ≤ 1 and another line for x > 1, meeting at the point (1, 5).

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

The graph consists of two linear pieces with a break at x = 1.

## 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.**

The function is continuous at x = 0 since both pieces meet at the same value, which is 0.

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

To analyze continuity, check if the left-hand limit equals the right-hand limit at x = 0.

**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 }.**

The graph of f(x) is continuous at x = 1, while g(x) has a jump discontinuity at that point.

**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 }.**

The graphs differ at x = 1, where f(x) is continuous and g(x) has a jump.

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

**Using a piecewise function for a tax system allows for clear representation of varying rates.**

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

**Using a piecewise function for a tax system allows for clear representation of varying rates, but it can complicate calculations.**

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

**The piecewise function can be defined as f(x) = { 5 for 0 < x ≤ 1, 5 + 3(x - 1) for x > 1 }.**

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**The piecewise function can be defined as f(x) = { 5 for 0 < x ≤ 1, 5 + 3(x - 1) for x > 1 }.**

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

**A real-world situation could be the pricing of a utility bill that changes based on usage levels.**

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

**A real-world situation could be the pricing of a utility bill where different rates apply based on usage levels.**