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Graphing Absolute Value Functions Worksheet Questions and Answers PDF

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Part 1: Building a Foundation

What is the general shape of the graph of an absolute value function?

Hint: Think about the basic geometric shape that represents absolute value.

○ A) Linear
○ B) Parabolic
○ **C) V-shaped** ✓
○ D) Circular

❘ The graph of an absolute value function is V-shaped.

Which of the following are characteristics of the graph of an absolute value function?

Hint: Consider the properties that define the graph's appearance.

☐ **A) It has a vertex.** ✓
☐ **B) It is symmetric about the y-axis.** ✓
☐ C) It is always increasing.
☐ **D) It is V-shaped.** ✓

❘ The graph has a vertex, is symmetric about the y-axis, and is V-shaped.

Explain what the vertex of an absolute value function represents in the context of its graph.

Hint: Think about the point where the graph changes direction.

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> **The vertex represents the minimum or maximum point of the graph, depending on its orientation.**

List the parameters in the vertex form of an absolute value function f(x) = a|x - h| + k and describe their roles.

Hint: Consider how each parameter affects the graph's position and shape.

1. a:

> Determines the vertical stretch or compression and direction of the graph.

2. h:

> Shifts the graph horizontally left or right.

3. k:

> Shifts the graph vertically up or down.

> The parameters a, h, and k affect the graph's vertical stretch, horizontal shift, and vertical shift, respectively.

Part 2: comprehension and Application

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If the vertex form of an absolute value function is f(x) = 2|x + 3| - 4, what is the vertex of the graph?

Hint: Identify the values of h and k in the vertex form.

○ **A) (-3, -4) ✔**
○ B) (3, 4)
○ C) (-3, 4)
○ D) (3, -4)

❙ The vertex of the graph is at (-3, -4).

How does the graph of f(x) = -|x| differ from the graph of f(x) = |x|?

Hint: Consider the effects of the negative sign on the graph.

☐ A) It is shifted downwards.
☐ **B) It is reflected across the x-axis. ✔**
☐ C) It is wider.
☐ D) It is narrower.

❙ The graph of f(x) = -|x| is reflected across the x-axis compared to f(x) = |x|.

Graph the function f(x) = -\frac{1}{2}|x - 4| + 2 and describe the transformations applied to the parent function f(x) = |x|.

Hint: Consider the effects of the coefficients and constants on the graph.

❙ **The graph is reflected, vertically compressed, shifted right, and shifted up.**

Which transformations are applied to the graph of f(x) = |x| to obtain f(x) = 2|x + 1| - 3?

Hint: Think about how each parameter affects the graph's position and shape.

☐ **A) Vertical stretch by a factor of 2 ✔**
☐ **B) Horizontal shift left by 1 unit ✔**

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☐ **C) Vertical shift down by 3 units** ✓

☐ D) Reflection across the x-axis

> The graph undergoes a vertical stretch, horizontal shift left, and vertical shift down.

Part 3: Analysis, Evaluation, and Creation

If the graph of an absolute value function opens downwards and has a vertex at (2, -3), which of the following could be its equation?

Hint: Consider the implications of the vertex's position and the direction of opening.

○ **A) f(x) = -|x - 2| - 3** ✓

○ B) f(x) = -|x - 2| + 3

○ C) f(x) = |x - 2| - 3

○ D) f(x) = -|x + 2| - 3

> The equation could be f(x) = -|x - 2| - 3.

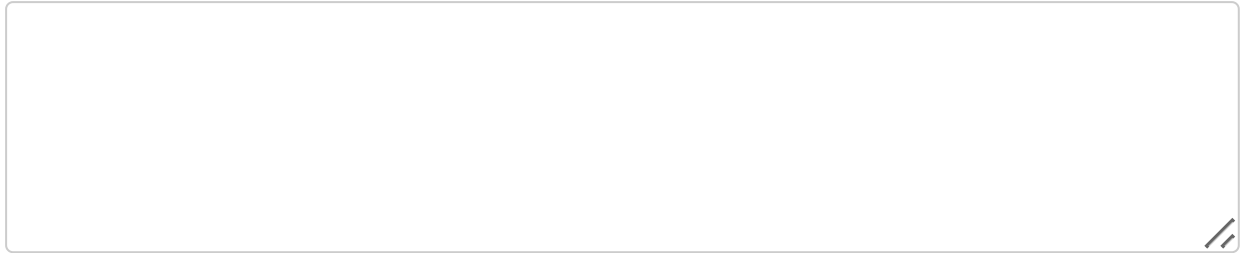**Analyze the function f(x) = -3|x + 2| + 5. Which of the following statements are true?**

Hint: Consider the effects of the coefficients and constants on the graph.

☐ **A) The graph is reflected across the x-axis.** ✓

☐ **B) The vertex is at (-2, 5).** ✓

☐ **C) The graph is compressed vertically.** ✓

☐ D) The graph is shifted 5 units up.

> The graph is reflected across the x-axis, the vertex is at (-2, 5), and it is vertically compressed.

Compare and contrast the graphs of f(x) = |x| and g(x) = |x - 4| + 2. Discuss the transformations involved.

Hint: Think about how the transformations affect the position and shape of the graphs.

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> **The graph of g(x) is shifted right and up compared to f(x).**

Which of the following functions represents a graph that is both vertically stretched and shifted downwards?

Hint: Consider the effects of the coefficients and constants on the graph.

○ A) f(x) = 2|x| + 3
○ B) f(x) = \frac{1}{2}|x| - 4
○ **C) f(x) = 3|x| - 2 ✓**
○ D) f(x) = -2|x| + 1

> The function f(x) = 3|x| - 2 represents a vertically stretched graph that is shifted downwards.

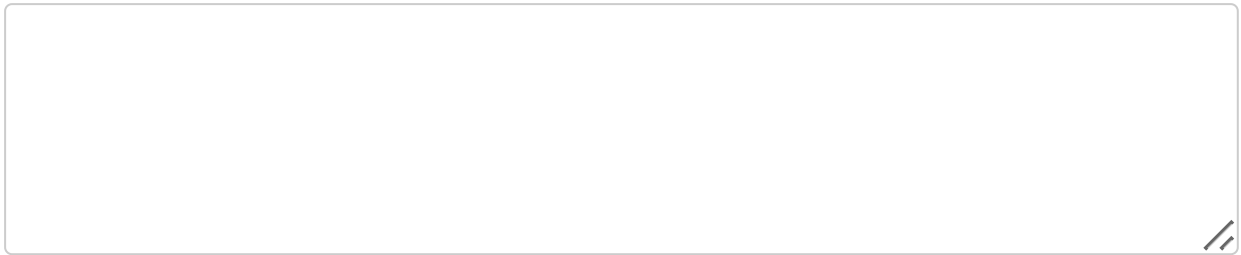**Design a function that has a vertex at (1, -2) and opens upwards. Which of the following could be correct?**

Hint: Consider the implications of the vertex's position and the direction of opening.

☐ **A) f(x) = |x - 1| - 2 ✓**
☐ **B) f(x) = 2|x - 1| - 2 ✓**
☐ C) f(x) = -|x - 1| + 2
☐ D) f(x) = \frac{1}{2}|x - 1| - 2

> The functions f(x) = |x - 1| - 2 and f(x) = 2|x - 1| - 2 both have the desired vertex and orientation.

Create an absolute value function that has a vertex at (-3, 4), opens downwards, and is vertically compressed. Provide the equation and describe the transformations applied.

Hint: Think about how to structure the equation to meet the criteria.

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An example function is $f(x) = -\frac{1}{2}|x + 3| + 4$, which opens downwards and is vertically compressed.

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