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Graphing A Quadratic Function Worksheet

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Part 1: Building a Foundation

Which of the following is the standard form of a quadratic function?

Hint: Recall the standard forms of quadratic functions.

◯ A) $f(x) = ax + b$
◯ B) $f(x) = ax^2 + bx + c$
◯ C) $f(x) = a(x-h)^2 + k$
◯ D) $f(x) = ax^3 + bx^2 + cx + d$

Identify the correct statements about the graph of a quadratic function.

Hint: Consider the properties of parabolas.

☐ A) It is always a straight line.
☐ B) It is a parabola.
☐ C) It can open upwards or downwards.
☐ D) It always has a vertex.

Explain what the vertex of a parabola represents in the context of a quadratic function.

Hint: Think about the highest or lowest point of the graph.

List the key features of a parabola that are essential for graphING a quadratic function.

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Hint: Consider the components that define the shape of the graph.

1. What is the vertex?

[   ]

2. What is the axis of symmetry?

[   ]

3. What are the x-intercepts?

[   ]

Part 2: comprehension and Application

If the quadratic function f(x) = 2x^2 - 4x + 1 is graphed, what is the direction of the parabola?

Hint: Look at the coefficient of the x^2 term.

○ A) Upwards
○ B) Downwards
○ C) Left
○ D) Right

Which of the following transformations affect the width of a parabola?

Hint: Consider how changes in the coefficients impact the graph.

☐ A) Changing the value of a
☐ B) Changing the value of b
☐ C) Changing the value of c
☐ D) ReflectING over the x-axis

Graph the quadratic function f(x) = x^2 - 6x + 8 and identify the x-intercepts.

Hint: Use the quadratic formula or factoring to find the x-intercepts.

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Given the quadratic function f(x) = (x-3)^2 + 2, what is the vertex of the parabola?

Hint: Identify the vertex from the vertex form of the quadratic function.

○ A) (3, 2)
○ B) (-3, 2)
○ C) (2, 3)
○ D) (0, 2)

Part 3: Analysis, Evaluation, and Creation

Which of the following equations represents a parabola that opens downwards and has a vertex at (1, -2)?

Hint: Look for the equation that has a negative leading coefficient.

○ A) f(x) = -(x-1)^2 - 2
○ B) f(x) = (x+1)^2 + 2
○ C) f(x) = -(x+1)^2 + 2
○ D) f(x) = (x-1)^2 - 2

Analyze the quadratic function f(x) = 3x^2 - 12x + 9. Which of the following are true?

Hint: Consider the vertex and other characteristics of the function.

☐ A) The vertex is at (2, -3).
☐ B) The axis of symmetry is x = 2.
☐ C) The parabola opens upwards.
☐ D) The y-intercept is 9.

Explain how to determine the axis of symmetry for the quadratic function f(x) = ax^2 + bx + c.

Hint: Think about the formula for the axis of symmetry.

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Which quadratic function best models a scenario where a ball is thrown upwards, reaches a maximum height, and then falls back to the ground?

Hint: Consider the shape of the graph and the direction it opens.

○ A) f(x) = -2x^2 + 8x + 5
○ B) f(x) = 2x^2 - 8x + 5
○ C) f(x) = x^2 + 8x + 5
○ D) f(x) = -x^2 - 8x + 5

Create a quadratic function with a vertex at (4, -1) and that opens upwards. Which of the following could be the function?

Hint: Look for the vertex form of the quadratic function.

☐ A) f(x) = (x-4)^2 - 1
☐ B) f(x) = 2(x-4)^2 - 1
☐ C) f(x) = -2(x-4)^2 + 1
☐ D) f(x) = (x+4)^2 + 1

Design a real-world problem that can be modeled by a quadratic function, and explain how you would solve it using the graph of the function.

Hint: Think about scenarios involving projectile motion or area optimization.

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