

## Quadratic Word Problems Worksheet

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### Part 1: Building a Foundation

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#### What is the general form of a quadratic equation?

*Hint: Think about the standard representation of quadratic equations.*

- A)  $ax + b = 0$
- B)  $ax^2 + bx + c = 0$
- C)  $ax^2 + b = 0$
- D)  $ax^2 + bx = 0$

#### Which of the following are methods to solve quadratic equations? (Select all that apply)

*Hint: Consider various techniques used in algebra.*

- A) Factoring
- B) Graphing
- C) Completing the Square
- D) Using the Pythagorean Theorem

#### Explain what the discriminant of a quadratic equation is and how it affects the nature of the roots.

*Hint: Consider the formula and its implications.*

#### List the key features of a quadratic function's graph.

*Hint: Think about the shape and characteristics of the graph.*

1. What is the vertex?

2. What is the axis of symmetry?

3. What are the intercepts?

## Part 2: Comprehension and Application

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**What does the axis of symmetry of a quadratic function represent?**

*Hint: Consider the symmetry of the graph.*

- A) The point where the graph intersects the y-axis
- B) The vertical line that divides the parabola into two mirror images
- C) The highest or lowest point on the graph
- D) The horizontal line that the graph approaches but never touches

**Which of the following statements about the vertex of a quadratic function are true? (Select all that apply)**

*Hint: Think about the properties of the vertex.*

- A) It is the maximum or minimum point of the parabola.
- B) It is always located at the origin.
- C) Its x-coordinate is given by  $-b/(2a)$ .
- D) It is the point where the parabola changes direction.

**Given the quadratic equation representing the height of a projectile, describe how you would determine the maximum height reached by the projectile.**

*Hint: Consider the vertex of the parabola.*

**In a real-world scenario, which of the following could be modeled by a quadratic equation? (Select all that apply)**

*Hint: Think about situations that involve parabolic relationships.*

- A) The trajectory of a basketball shot
- B) The growth of a bank account with compound interest
- C) The area of a square as a function of its side length
- D) The depreciation of a car's value over time

### Part 3: Analysis, Evaluation, and Creation

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**If the discriminant of a quadratic equation is zero, what can be concluded about the roots?**

*Hint: Consider the implications of the discriminant value.*

- A) There are two distinct real roots.
- B) There is one real root.
- C) There are two complex roots.
- D) There are no roots.

**Analyze the following quadratic equation:  $x^2 - 4x + 4 = 0$ . Which statements are true? (Select all that apply)**

*Hint: Consider the properties of the given equation.*

- A) The equation can be factored as  $(x - 2)^2 = 0$ .
- B) The vertex of the parabola is at  $(2, 0)$ .
- C) The parabola opens downwards.
- D) The roots are real and equal.

**Explain how you would use the method of completing the square to solve the quadratic equation  $x^2 + 6x + 5 = 0$ .**

*Hint: Think about the steps involved in completing the square.*

**Which of the following scenarios would not be appropriately modeled by a quadratic equation?**

*Hint: Consider the nature of the relationships involved.*

- A) The height of a thrown ball over time
- B) The area of a rectangle as a function of its length
- C) The path of a satellite orbitin Earth
- D) The profit from selling  $x$  units of a product, where profit is a quadratic function of  $x$

**Create a real-world problem that can be modeled by a quadratic equation. Describe the scenario and formulate the equation.**

*Hint: Think about situations involving area, projectile motion, or profit.*