

# Quadratic Functions Worksheet Answer Key PDF

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## Part 1: Building a Foundation

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**What is the standard form of a quadratic function?**

undefined. **A)  $ax^2 + bx + c$  ✓**

undefined. B)  $a(x-h)^2 + k$

undefined. C)  $ax + b$

undefined. D)  $a(x-p)(x-q)$

The standard form of a quadratic function is represented as  $ax^2 + bx + c$ .

**Which of the following are forms of a quadratic function? (Select all that apply)**

undefined. **A) Standard form ✓**

undefined. **B) Vertex form ✓**

undefined. C) Linear form

undefined. **D) Intercept form ✓**

The forms of a quadratic function include standard form, vertex form, and intercept form.

**Explain what the discriminant of a quadratic equation tells us about the roots of the equation.**

**The discriminant indicates the number and type of roots: if it's positive, there are two distinct real roots; if zero, one real root; if negative, no real roots.**

**List the key features of a parabola formed by a quadratic function.**

1. What is the vertex?

**The vertex is the highest or lowest point of the parabola.**

2. What is the axis of symmetry?

The axis of symmetry is a vertical line that divides the parabola into two mirror images.

3. What does it mean if the parabola opens upwards?

It means the coefficient 'a' in the quadratic function is positive.

Key features include the vertex, axis of symmetry, direction of opening, and intercepts.

## Part 2: Understanding and Interpretation

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If a quadratic function opens upwards, what can be said about the coefficient a?

undefined. A)  $a < 0$

undefined. B)  $a = 0$

undefined. C)  $a > 0$  ✓

undefined. D) a can be any value

If a quadratic function opens upwards, the coefficient 'a' is greater than zero.

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

undefined. A) It is the highest or lowest point on the graph. ✓

undefined. B) It is always located at the origin.

undefined. C) It lies on the axis of symmetry. ✓

undefined. D) It is the midpoint of the x-intercepts. ✓

The vertex is the highest or lowest point on the graph, lies on the axis of symmetry, and is the midpoint of the x-intercepts.

Describe how the value of a affects the width of a parabola.

The value of 'a' affects the width of the parabola; larger absolute values of 'a' result in a narrower parabola, while smaller absolute values result in a wider parabola.

## Part 3: Application and Analysis

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Given the quadratic function  $f(x) = 2x^2 - 4x + 1$ , what is the y-intercept?

undefined. A) 1 ✓

undefined. B) -4

undefined. C) 2

undefined. D) 0

The y-intercept is the value of the function when  $x = 0$ , which is 1.

**Which methods can be used to find the roots of the quadratic equation  $x^2 - 5x + 6 = 0$ ? (Select all that apply)**

undefined. A) Factoring ✓

undefined. B) Completing the square ✓

undefined. C) Using the quadratic formula ✓

undefined. D) Graphing

The roots can be found using factoring, completing the square, or the quadratic formula.

**Convert the quadratic function  $f(x) = x^2 + 6x + 8$  into vertex form.**

**The vertex form of the function is  $f(x) = (x + 3)^2 - 1$ .**

**What is the axis of symmetry for the quadratic function  $f(x) = 3x^2 + 6x + 2$ ?**

undefined. A)  $x = -1$  ✓

undefined. B)  $x = -2$

undefined. C)  $x = 1$

undefined. D)  $x = 2$

The axis of symmetry is  $x = -1$ .

**For the quadratic function  $f(x) = -x^2 + 4x - 3$ , which of the following are true? (Select all that apply)**

undefined. A) The parabola opens upwards.

undefined. B) The vertex is a maximum point. ✓

undefined. C) The axis of symmetry is  $x = 2$ . ✓

undefined. D) The y-intercept is -3. ✓

The parabola opens downwards, the vertex is a maximum point, the axis of symmetry is  $x = 2$ , and the y-intercept is -3.

Analyze the quadratic function  $f(x) = x^2 - 4x + 4$  and describe its graph in terms of vertex, axis of symmetry, and intercepts.

The graph has a vertex at  $(2, 0)$ , an axis of symmetry at  $x = 2$ , and a double root at  $x = 2$ .

## Part 4: Evaluation and Creation

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Which of the following quadratic functions has no real roots?

undefined. A)  $x^2 + 4x + 4$

undefined. **B)  $x^2 - 4x + 5$  ✓**

undefined. C)  $x^2 - 2x + 1$

undefined. D)  $x^2 + 2x - 3$

The function  $x^2 - 4x + 5$  has no real roots as its discriminant is negative.

Evaluate the following statements about the quadratic function  $f(x) = 2(x-3)^2 + 5$ . Which are correct? (Select all that apply)

undefined. **A) The vertex is at  $(3, 5)$ . ✓**

undefined. B) The parabola opens downwards.

undefined. **C) The axis of symmetry is  $x = 3$ . ✓**

undefined. **D) The minimum value of the function is 5. ✓**

The vertex is at  $(3, 5)$ , the parabola opens upwards, the axis of symmetry is  $x = 3$ , and the minimum value is 5.

Create a real-world scenario where a quadratic function could be used to model a situation. Describe the scenario and the role of the quadratic function.

A scenario could involve a ball being thrown, where the height of the ball as a function of time is modeled by a quadratic function.