

Introduction

This assessment is designed to evaluate students' understanding of solving quadratic equations using factoring, quadratic formula, and graphing methods. It is intended for students aged 13-15 years old and aligns with the learning objectives of the mathematics curriculum.

Section 1: Multiple Choice Questions

Choose the correct answer for each question. You have 15 minutes to complete this section.

1. What is the factored form of the quadratic equation $x^2 + 5x + 6 = 0$?
 1. a) $(x + 2)(x + 3)$
 2. b) $(x - 2)(x - 3)$
 3. c) $(x + 1)(x + 6)$
 4. d) $(x - 1)(x - 6)$
2. What is the solution to the quadratic equation $x^2 - 4x - 5 = 0$ using the quadratic formula?
 1. a) $x = -1$ or $x = 5$
 2. b) $x = 1$ or $x = -5$
 3. c) $x = 2$ or $x = -2$
 4. d) $x = -2$ or $x = 2$
3. What is the graph of the quadratic equation $y = x^2 + 2x - 3$?
 1. a) A parabola that opens upwards with a vertex at $(-1, -4)$
 2. b) A parabola that opens downwards with a vertex at $(1, 4)$
 3. c) A parabola that opens upwards with a vertex at $(1, -4)$
 4. d) A parabola that opens downwards with a vertex at $(-1, 4)$

Section 2: Short Answer Questions

Answer each question in the space provided. You have 15 minutes to complete this section.

1. Solve the quadratic equation $x^2 + 2x - 6 = 0$ using factoring.

2. Graph the quadratic equation $y = x^2 - 3x - 2$ and identify its x-intercepts and vertex.

3. Analyze and interpret the solutions of the quadratic equation $x^2 + 4x + 4 = 0$ in context.

Section 3: Essay Question

Answer the question in the space provided. You have 15 minutes to complete this section.

Apply the quadratic equation $x^2 + 2x - 6 = 0$ to a real-world problem. Analyze and interpret the solutions in context and provide a clear and concise explanation of your reasoning and calculations.

Section 4: Graphing Activity

Graph the quadratic equation $y = x^2 - 2x - 3$ on the grid provided. Identify the x-intercepts and vertex of the parabola.

x	y

Section 5: Word Problems

Read each problem carefully and solve the quadratic equation. Show your work and explain your reasoning.

1. A ball is thrown upwards from the ground with an initial velocity of 20 m/s. The height of the ball above the ground is given by the equation $h = -5t^2 + 20t$, where t is the time in seconds. Find the time when the ball reaches its maximum height.

2. A company sells x units of a product at \$10 per unit. The cost of producing x units is given by the equation $C = 2x^2 + 5x + 100$. Find the number of units that the company must sell to break even.

Conclusion

This assessment is designed to evaluate students' understanding of solving quadratic equations using factoring, quadratic formula, and graphing methods. It is intended to be completed within 45 minutes and aligns with the learning objectives of the mathematics curriculum.

Additional Resources

For additional support, please refer to the following resources:

- Quadratic Equations Tutorial
- Graphing Quadratic Equations Worksheet
- Word Problems Involving Quadratic Equations

