

## Quadratic Equations

Students who study quadratic equations are learning to answer the questions

*What is the appropriate situation to use different methods to solve a quadratic equation?*

*What is the relationship between factors, roots, and zeros of a polynomial expression?*

*Can knowing the nature of the roots of an equation be as valuable as knowing the roots themselves?*

This unit of study addresses Indiana College & Career Ready Standards as follows:

**AI.QE.4:** Solve quadratic equations in one variable by inspection (e.g., for  $x^2 = 49$ ), finding square roots, using the quadratic formula, and factoring, as appropriate to the initial form of the equation.

**AI.QE.5:** Represent real-world problems using quadratic equations in one or two variables and solve such problems with and without technology. Interpret the solution and determine whether it is reasonable.

**AI.QE.6:** Use the process of factoring to determine zeros, lines of symmetry, and extreme values in real-world and other mathematical problems involving quadratic functions; interpret the results in the real-world contexts.

**AI.QE.7:** Describe the relationships among the solutions of a quadratic equation, the zeros of the function, the x-intercepts of the graph, and the factors of the expression.

Gaining skills in this unit will enable students to do everyday tasks like maximizing raw materials for a building project, making a throw to the plate from right field, and picking out the best spot to watch fireworks. The specific skills in this unit of study include

- graphing quadratic functions
- solving quadratic equations by factoring
- solving quadratic equations by completing the square
- solving quadratic equations with the quadratic formula
- using the discriminant
- identifying sums and product of roots
- solving systems of quadratic equations
- solving quadratic inequalities