

Name: _____ Date: _____ Band: _____
Algebra 2

Quadratic Equations & Complex Numbers Performance Task

Instructions: Choose one performance task. Write all your work on a separate clean piece of paper and attach it to this page.

Big Idea: Equivalence and Function

The parameters a , b , c , h , and k in the standard and vertex forms of a quadratic function give information on how the graph of the function relates to the graph of the parent function $y = x^2$.

$$\text{Standard form: } y = ax^2 + bx + c$$

$$\text{Vertex form: } y = a(x - h)^2 + k$$

Performance Task 1

Refer to the two forms shown above.

- What information do the parameters, or combinations of parameters, provide about the graph of the quadratic function?
- Being with standard form. Transform it to vertex form. What are the values of h and k in terms of a , b , and c ?
- Show how the Quadratic Formula follows from your result in part (b). *Hint:* Set the expression in your vertex form equal to 0. Then solve by factoring.

Big Idea: Solving Equations and Inequalities

A problem may require different types of equation solving. You should know when and how to use a graphing calculator to help you with your work.

Performance Task 2

You shoot an arrow at a target. The parabolic path of your arrow passes through the points shown in the table. Answer parts (a)-(d) below. Justify your answers.

- Find a quadratic function in standard form that models the path of your arrow. *Hint:* The three points are (x, y) -values that satisfy $y = ax^2 + bx + c$.
- If the y -value represents height above the ground, for what value of x would your arrow hit the ground if you miss the target?
- If the target bull's eye is at $x = 100$, at what height should the bull's eye be for your arrow to hit it?
- If the target bull's-eye is at height $y = 2.98$, at what value of x should the bull's-eye be for the arrow to hit it?

x	y
30	6
60	7
100	4