

# Graphing Quadratics

## Case Overview

### *Background on the Classroom Lesson*

This video comes from a first-year high school algebra class.

### *Student Activity*

Students were asked to sketch the graph of a parabola that contains the following four points:

(3, 12), (-3, 6), (5, 30), (9, 90).

### *Overview of the Video*

In the video, one student, Chrissy, presents her solution to the class, giving the equation as  $n^2 + n$  and sketching a graph of the four points connected by linear segments. The class discusses the student's graph in detail. When watching (or re-watching), focus on students' ideas about the shape of the graph. Consider which features of a quadratic function stand out to students and how these ideas support their discussion.

### *Questions to Consider about Student Thinking*

We think some of the richest student thinking in this video includes students' ways of reasoning about the graph of the quadratic function. In what follows, we provide sets of questions about how students use the equation, individual points, and general properties like symmetry to develop a more complete picture of the graph.

1. Chrissy's Question:
  - a) What concern does Chrissy raise about her graph?
  - b) How do other students respond to Chrissy's graph?
2. Reasoning About the Vertex of a Parabola:
  - a) How do students reason about where the vertex of the parabola (or "the bounce") should be located on the graph?
3. Symmetry of a Parabola:
  - a) How does thinking about the symmetry of a parabola affect students' thinking about the graph?
  - b) Which properties of quadratics seem to be the most salient to students when reasoning about the graph?