# Lesson 8 Teaching Portal Materials

## Episode Supports

### Episode 6: Exploring

**Episode Description**

Sasha and Keoni notice patterns in the equations they have derived for parabolas with the same *p*-values but different vertices. They predict the equation for a parabola with a *p*-value of 3 and a vertex at (7, 2).

**Students' Conceptual Challenges**

Keoni initially thinks the distance from a general point to the directrix $(y = -1)$ is $y - 1$ [**3:48**]. Sasha questions this [**3:58**]. Keoni explains that he was only looking at the label of the directrix when he labeled the distance [**4:06**].

- Together, they point out the distances of $y$, 1, and $y + 1$. Using the coordinate grid, they make sense of the three lengths of the sides of the triangle [**4:14-5:54**].

**Focus Questions**

For use in a classroom, pause the video and ask these questions:

1. Pause the video at **1:27**]. How does Keoni know that his point is a "special point"?
2. [Pause the video at **8:11**]. Why did Keoni multiply out the $(y - 5)^2$ and the $(y + 1)^2$terms but leave the $(x - 7)^2$ unchanged?

**Supporting Dialogue**

Provide opportunities to for students to revoice mathematical thinking. Ask a few students to revoice the ideas used in this episode:

- Revoice how you can determine the lengths of the sides of the triangle.
- Revoice how Sasha and Keoni solved for $y$ [**8:14- 8:59**].

**Math Extensions**

1. Try deriving the equation of another parabola using the methods of this episode. Derive the equation for a parabola with a *p*-value of 3 and a vertex of (–4, 1).

2. Show your work as you derive this equation. Label your focus and directrix as well as the lengths of the sides of the right triangle.