

## Lesson 8 Teaching Portal Materials

### Episode Supports

#### Episode 2: Exploring

##### Episode Description

Keoni and Sasha use the Pythagorean Theorem and the definition of a parabola to derive an equation of parabola with a  $p$ -value of 3 and a vertex at  $(7, 0)$ .

##### Students' Conceptual Challenges

At [1:31], Sasha whispers, "It looks weird; I don't get it." In this new situation where the vertex has shifted over by 7 units, it is challenging to construct a right triangle like they used when the vertex was on the origin.

- While examining what they have drawn so far, Keoni adds an important side of the triangle. He chooses the focus as one of the corners of the triangle. His choice of where to place the side of the triangle results in a useful right triangle. As the episode continues, they figure out how to represent the length of each side of the triangle.

##### Focus Questions

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

1. [Pause the video at 0:47]. How does Keoni know where to place the focus and the directrix for this parabola?
2. [Pause the video at 6:15]. Looking at the two right triangles, what is the same and what is different?
3. [Pause the video at 9:29]. What is the difference between the representation of  $(x - 7)^2$  and  $x^2 - 14x + 49$ ?

##### Supporting Dialogue

Invite students to engage in stating and justifying mathematical claims with another student:

- Work with a partner to justify the representation of  $x - 7$  for the length of the horizontal side of the triangle that Sasha and Keoni used to derive the equation of a parabola.

"Lesson 8 Episode 2 Teacher Support Materials" by MathTalk is licensed under CC BY-NC-SA 4.0



- Work with a partner to justify the representation of  $y - 3$  for the length of the vertical side of the triangle that Sasha and Keoni used to derive the equation of a parabola.

### Math Extensions

During the video [1:09], Sasha and Keoni have a brief discussion about choosing what point on the parabola to use to derive the equation for the parabola. They mention the “special point” and the need not to choose it. They state that they need a general point.

1. What do they mean by a special point? What are the coordinates for a “special point” on the parabola in this episode?
2. What do they mean by a general point?
3. What would happen if they used a special point to derive the equation for the parabola?

