Lesson 6 Teaching Portal Materials

Episode Supports

Episode 1: Making Sense

Episode Description

Sasha and Keoni use the equation $y = \frac{x^2}{4p}$ to plot a parabola for $p = \frac{1}{4}$. They make a conjecture for how the shape of the parabola will change as p gets larger.

Students' Conceptual Challenges

After using the equation $y = x^2$ to plot points on the parabola with a *p*-value of $\frac{1}{4}$, Keoni struggles to locate coordinates of the focus of the parabola [**5:06-5:24**]. He first places the focus at (0,1) [**5:35-5:59**]. Keoni states that (0,1) is a "general place" to put the focus.

- Sasha and Keoni notice a conflict when asked to state the *p*-value for the parabola when the focus is one unit above the origin. They restate that *p* is the distance between the focus and the vertex. Keoni notices that they are currently working with a *p*-value of $\frac{1}{4}$. Consequently, Sasha and Keoni adjust the focus location [**6:02-6:19**].

Focus Questions

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

1. [Pause the video at **5:05**]. What are some other points that you know are on the parabola because of the geometry of the parabola?

2. [Pause the video at **9:16**]. What are the coordinates of the red point that Keoni says is on the parabola?

Supporting Dialogue

Invite students attend to the reasoning of others while reflecting on multiple strategies.

- Stop the video at [**10:00**]. Ask one student to present one method for checking to see if the point (½, ¼) is on the parabola. Ask a second student to use the first student's method to

check a different point, say (1,1).

- Repeat the process for a new method of checking.

Math Extensions

1. What happens when the focus is below the vertex? Graph the parabola with a focus at (0, -¼) and vertex at (0, 0). Label the focus, the directrix, and several points on the parabola.