Lesson 6 Teaching Portal Materials

Episode Supports

Episode 2: Exploring

Episode Description

Keoni and Sasha continue to explore the role that the p-value has on the shape of the graph of parabolas represented by $y = \frac{x^2}{4p}$. They graph a parabola with a p-value of $\frac{1}{2}$, and compare it to the graph of a parabola with a p-value of $\frac{1}{4}$ from Episode 1.

Students' Conceptual Challenges

As Keoni and Sasha graph the parabola with $p = \frac{1}{2}$, they seem surprised by the question asking them to predict the *x*-value of a point on the parabola for a *y*-value of 4 [**6:25-6:52**]. They struggle to make sense of the question.

- Sasha and Keoni revoice the question. Sasha makes geometric sense of the question by moving her hand along a horizontal line at *y* = 4. Using her sense of the shape of a parabola, she indicates a region on the coordinate grid where she expects to find the point [**6:59-7:14**]. They use the equation for the parabola ($y = \frac{x^2}{2}$) to find a precise x-value when the *y*-value is 4.

Focus Questions

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

1. [Pause the video at **1:14**]. Sasha and Keoni have drawn a horizontal line. What is true about every point on that horizontal line?

2. [Pause the video at **5:49**]. Plot some other points on the parabola where the *p*-value is $\frac{1}{2}$. Then we will compare our work with Sasha and Keoni's.

3. [Pause the video at **6:22**]. How did Sasha and Keoni determine that the points (-2,2) and (2,2) are on the parabola?

Supporting Dialogue

Invite students to engage reflect on the multiple methods to approach a problem by asking:

- Can someone share one method they used to find a point on the parabola? Who has another method?

- What is one way that you see how the shape of the parabola changes when the *p*-value changes from $\frac{1}{4}$ to $\frac{1}{2}$? Who sees it differently?

Math Extensions

1. On one coordinate grid, graph two parabolas with a vertex on the origin: one where the focus is $\frac{1}{4}$ units below the vertex, and one where the focus is $\frac{1}{2}$ units below the vertex. For each parabola, label its directrix, the coordinates of the focus, and several points on the parabola.

2. How did you find the coordinates of the points on the parabola? Describe each method that you used.