

Lesson 5 Teaching Portal Materials

Episode Supports

Episode 2: Exploring

Episode Description

Keoni and Sasha develop an equation for a parabola which has a vertex of $(0,0)$ and distance of 2 units between the vertex and the focus. They use the Pythagorean theorem and the definition of a parabola.

Students' Conceptual Challenges

Keoni initially thinks that the distance from a general point (x, y) on the parabola to the directrix will be $y + 1$ [1:04].

- ➡ Keoni quickly catches himself and realizes that when the distance between the vertex and the focus is 2 units (instead of 1 unit, as it was with the parabola that they worked with in Lessons 2-4), then the distance from the x-axis to the directrix will also be 2 units. Thus, the distance from (x, y) to the directrix will be $y + 2$.

Focus Questions

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

1. [Pause the video at 0:52]. Keoni has drawn two lines. What do you know about those two lines?
2. [Pause the video at 3:50]. Solve for x . [Then start the video again and stop at 5:00]. How did your solution method compare with Sasha and Keoni's?

Supporting Dialogue

Invite students to engage in revoicing (to say what they hear from someone else in their own words).

1. In responding to the Focus Question 1, ask one student to revoice what another student said about the two lines.

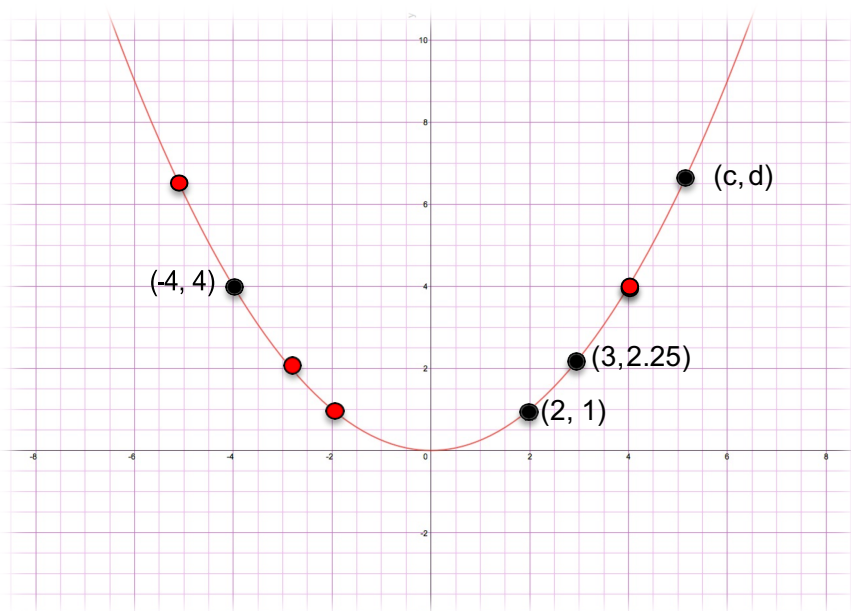
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2. After the narrator has highlighted the meaning of the lengths that Sasha and Keoni found for the sides of their right triangle [2:09–3:28], call on different students to revoice the meaning of $y+2$, $y-2$ and x .

Math Extensions

1. The equation $y = \frac{\$}{\%}$ represents the parabola shown in red in the figure below. The coordinates for some points on the parabola are given. What do you notice about the red and grey points?



2. Find the coordinates for the red points in the graph above. Explain your reasoning.