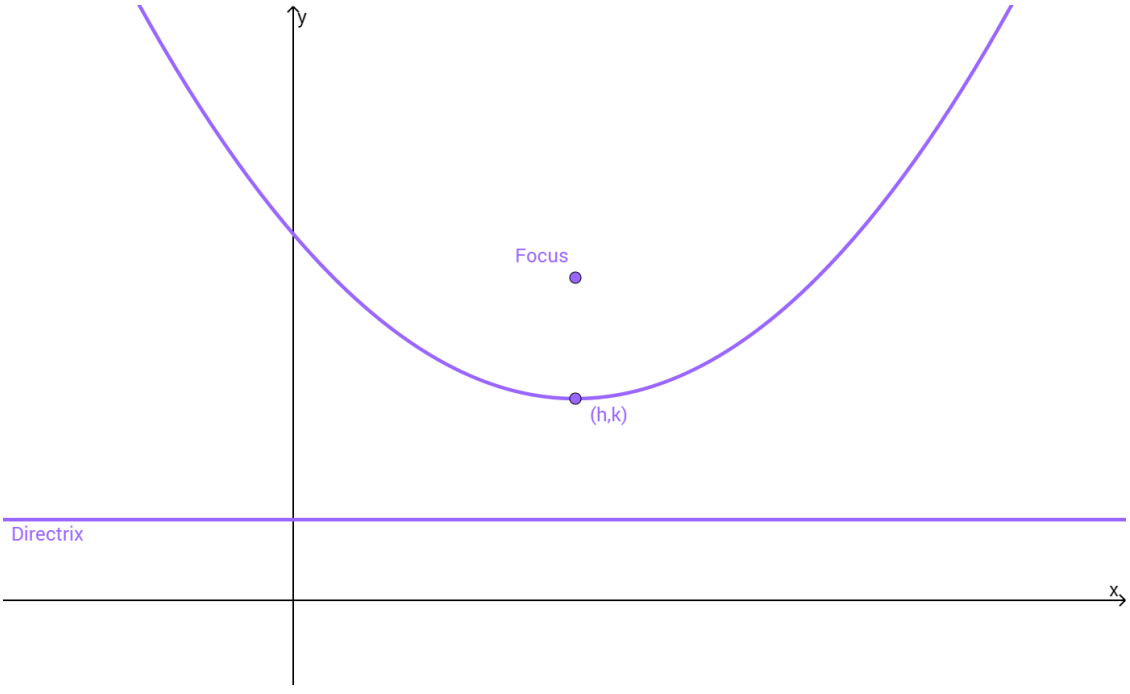
Homework 5

1. Deriving the Vertex Form of a Parabola

Derive the general equation for any parabola with a vertex (h,k) and distance of *p* from the vertex to the focus. Use the definition of a parabola and the Pythagorean Theorem. In your write-up, include a **well-labeled graph** with an **algebraic expression clearly labeled for each side of the right triangle**. Include a clear **description** of how you figured out the coordinate pair for the focus and an equation for the directrix. Also **explain** how you found the expressions that represent the lengths of the sides of your right triangle. Finally, include your algebraic manipulations and the **final equation**.

You can either work on your derivation first and then watch Sasha and Keoni or vice versa. View videos from www.mathtalk.org, Parabolas, Lesson 9, Episodes 6 and 7. *Note that in Episode 7, they had never multiplied trinomials before. So, the teacher taught them how (off-camera), since that wasn't a focus of the lesson, and then the video only shows them being able to do it.*

If you have any trouble, you may want to first work derive the equation representing a family of parabolas with vertex (9,13) and distance of p between the vertex and focus, and view the videos from Lesson 9, Episodes 3-5. This is optional.



2. Reflecting on Sasha and Keoni.

You've seen Sasha and Keoni come a long way, if you think back to the first lesson, when they constructed a parabola from its definition, to what you just viewed from Lesson 9 of the MathTalk videos.

a. List three specific mathematical understandings that you think Sasha and Keoni have developed over time in the Parabolas Unit.

Homework 5

b. Identify two ways in which Sasha and Keoni work together that have impressed you.
c. Name one thing that you learned about teaching from watching the videos.