

Homework 2

Complete an individual, final, polished write-up of a solution to the Construct-a-Parabola task:

Create a collection of points that form a parabola by using its definition.

DEFINITION: A parabola is the set of points that are equal distance from a fixed point (called the focus) and a fixed line (called the directrix).

- You must place a minimum of 5 points on your parabola.
- You are required to explain your thinking, not just list your steps. In other words, say **why** you completed a particular action – what were you trying to accomplish.
- Be sure to appeal to the definition of a parabola in your explanations, since every point on your parabola has to satisfy the definition.
- Do **NOT** use a graph.
- You may use any method you wish, as long as it is systematic and generalizable (meaning that it would allow you to place all points on the parabola if you continued). You may adopt and complete one of your classmate's methods. You can use Sasha and Keoni's methods or something you find on the internet. If you do engage in some internet research and locate a new method, just make sure to fully process it and present it in your own way. There are many ways to solve this task. If you solved it one way in class, you may want to try a different way for this assignment.
- You may use any materials that you have at home to work on the task: ruler, scissors, compass, rubber bands, string, sticks, wire, etc.
- Include a well-labeled drawing (the points you have placed and any lines or other objects you used to create the points) and an explanation of your thinking.
- When you measure the distance from a potential point on the parabola to the directrix, you need to establish how to create a perpendicular. You can use materials you have at home – you don't need a compass and straightedge construction -- but don't just eyeball it either. In other words, you need to know it was perpendicular.
- The presentation should be polished.
- Create this write-up so that a **high school student** could follow it.
- You are strongly encouraged to show **multiple diagrams in stages**, explaining what you are doing and thinking for each stage. You can use your smart phone

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to take pictures or scans to show step-by-step how you constructed the parabola, with a verbal description near each photo.

- If your solution approach uses more than one method (e.g., Sasha and Keoni used 3 methods – Method 1 to place a vertex, Method 2 to place 2 points horizontally aligned with the focus, and Method 3 to place a general point), you are required to include a diagram and description for each method.
- If you want to view Sasha and Keoni’s method again, you can view their method from the Project MathTalk website. Go to www.mathtalk.org. Select “Students”; then select “Parabolas”; click on “Lesson I”; select “Episode 1” if you want to see them make sense of the problem statement. Select Episode 2 if you want to watch their methods for constructing the parabola.