

Parabola Construction

ID: 12553

Time required

15 minutes

Activity Overview

Students will construct a parabola using the focus and directrix definition. An extension problem has students explore how the location of the focus with respect to the directrix affects the shape of the parabola.

Topic: Quadratic Functions

- Geometric Definition of Parabola
- Locus
- Midpoint, Perpendicular Lines

Teacher Preparation and Notes

- Students are given the focus and directrix and must construct the parabola. Students should be familiar with constructing perpendicular lines, finding midpoints, and using **Geometry Trace** to complete this activity.
- The extension activity may be used as a separate exploration rather than as part of the first activity.
- To download the student and solution TI-Nspire™ documents (.tns files) and student worksheet, go to education.ti.com/exchange and enter "12553" in the keyword search box.

Associated Materials

- ParabolaConstruction_Student.doc
- ParabolaConstruction.tns
- ParabolaConstruction_Soln.tns

Suggested Related Activities

To download any activity listed, go to education.ti.com/exchange and enter the number in the keyword search box.

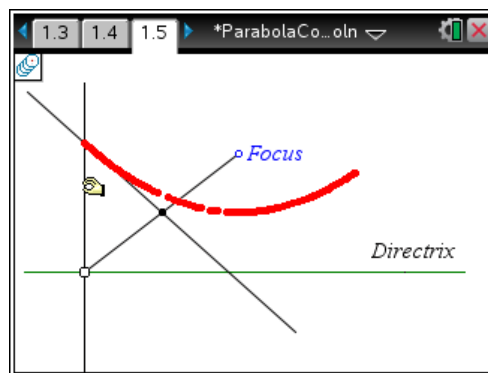
- Exploring the Parabola (TI-Nspire™ technology) — 8358
- Properties of Parabolas (TI-Nspire™ technology) — 8852

Problem 1 – Constructing a Parabola

Students will follow the directions given on the worksheet and in the .tns file to construct a parabola from the focus and directrix definition.

Discussion Questions

- Why do we need to find the midpoint of the segment connecting the directrix and focus?
- Why are two perpendicular lines used to find the point that traces the parabola?
- If we connected the focus to the point that traces the parabola, what kind of figure is formed with the segment we drew in Step 1 and the line perpendicular to the directrix?



Extension – Exploring the Parabola

Students will use a pre-constructed page to explore what happens to the shape of the parabola when the focus is moved. Students will then answer questions about their exploration.

In order to answer the second question, students can move the directrix by moving the open square point in the bottom left of the screen.

When students move the focus, they will only be able to move to up and down.

In order to answer the last question, students will need to move the focus left and right. Moving the open square point at the top of the screen will move the focus left and right.

