



Introduction to Conics

Student Activity

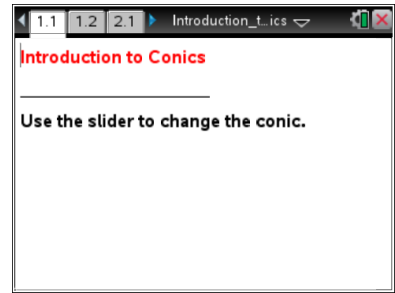


Name _____

Class _____

Open the TI-Nspire document *Introduction_to_Conics.tns*.

Is there a relationship between the locus definition and the vertex form of a parabola? In this activity, you will explore conic sections and the parabola.



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1. Use ▲ and ▼ to scroll through the different conic sections. Briefly describe how each of the conic sections is formed. Complete the table below.

Conic Section	Description
Circle	
Ellipse	
Parabola	
Hyperbola	

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2. Point F is called the focus of the parabola. What is the line through point F perpendicular to the directrix called?
3. Line d is called the directrix. What is the relationship between line d and the dashed line through point F ?
4. Drag point P along the curve. What property seems to be true for all points along the parabola?
5. Drag point F around the screen. Does the property observed in Question 4 remain true? Explain your answer.



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6. The vertex form of the equation for a parabola, $y = a(x - h)^2 + k$, is shown.
Use ▲ and ▼ to change the value of a . Describe how the value of a affects the graph.

7. Use ▲ and ▼ to change the value of h . Describe how the value of h affects the graph.

8. Use ▲ and ▼ to change the value of k . Describe how the value of k affects the graph.

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9. Given focus (m, n) , directrix $y = d$, and point (x, y) on a parabola, use the distance formula to derive the equation for any parabola function.
 - a. Find the distance between the focus and point P .

 - b. Find the distance between point P and the directrix.

 - c. Set the two distances you found in Questions 9a and 9b equal to each other and solve for y .

10. Use the vertex form of the equation for a parabola, $y = a(x - h)^2 + k$, and the derived equation from Question 9 to answer the following questions.
 - a. Explain the relationship among the focus, the directrix, and the value of a .

 - b. Explain the relationship between the focus and the value of h .

 - c. Explain the relationship among the focus, the directrix, and the value of k .