Conics Homework – Homework: Hyperbolas^{*}

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Abstract

This module provides homework problems related to hyperbolas.

Exercise 1

Complete the following chart, showing the similarities and differences between ellipses and hyperbolas.

.89999999999999999

	Ellipse	Hyperbola
How to identify an equation with this shape	Has an x^2 and a y^2 with dif- ferentcoefficients but the same sign. $3x^2 + 2y^2$ for instance.	
Equation in standard form: horizon- tal	$\frac{(x-h)^2}{a^2}\frac{(y-k)^2}{b^2} = 1$	
How can you tell if it is horizontal?		
Draw the shape here. Label $a, b, and c$ on the drawing.		
Center	(h,k)	
What a represents on the graph		
What b represents on the graph		
What c represents on the graph		
		continued on next page

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Which is the biggest, $a, b, \text{ or } c$?	
Mathematical relationship between $a, b, and c$.	

Table 1

Exercise 2
$$\frac{y^2}{\left(\frac{1}{4}\right)} - \frac{(x-2)^2}{9} = 1$$

- **a.** Is it horizontal or vertical?
- **b.** What is the center?
- **c.** What is a?
- **d.** What is b?
- **e.** What is c?
- f. Graph it. Make sure the box and asymptotes can be clearly seen in your graph.

Exercise 3

 $2x^2 + 8x - 4y^2 + 4y = 6$

- **a.** Put in standard form.
- **b.** Is it horizontal or vertical?
- ${\bf c.}$ What is the center?
- **d.** What is a?
- **e.** What is b?
- **f.** What is c?
- g. Graph it. Make sure the box and asymptotes can be clearly seen in your graph.
- h. What is the equation for one of the asymptotes that you drew?

Exercise 4

A hyperbola has vertices at the origin and (10,0). One focus is at (12,0). Find the equation for the hyperbola.

Exercise 5

A hyperbola has vertices at (1,2) and (1,22), and goes through the origin.

- **a.** Find the equation for the hyperbola.
- **b.** Find the coordinates of the two foci.