

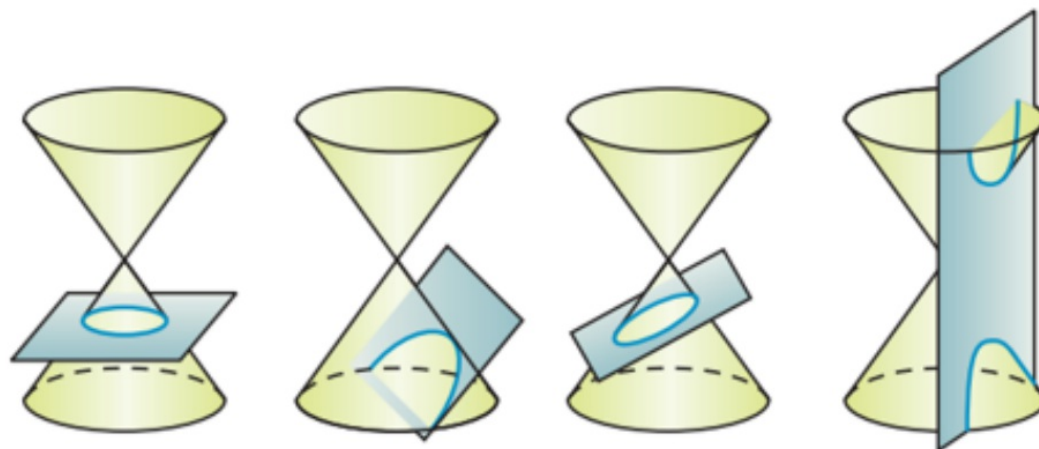
## 10.1 Exploring Conic Sections

### *Learning Targets for today*

- ① To be able to graph a circle using tables.
- ① To be able to graph an ellipse using tables.
- ① To be able to graph a hyperbola using tables.
- ① To be able to identify lines of symmetry.
- ① To be able to identify domain and range.

### *Vocabulary*

**Conic Sections** – the curve you get by intersecting a plane with a double cone. By changing the inclination of the plane you get *a circle, a parabola, an ellipse, or a hyperbola.*

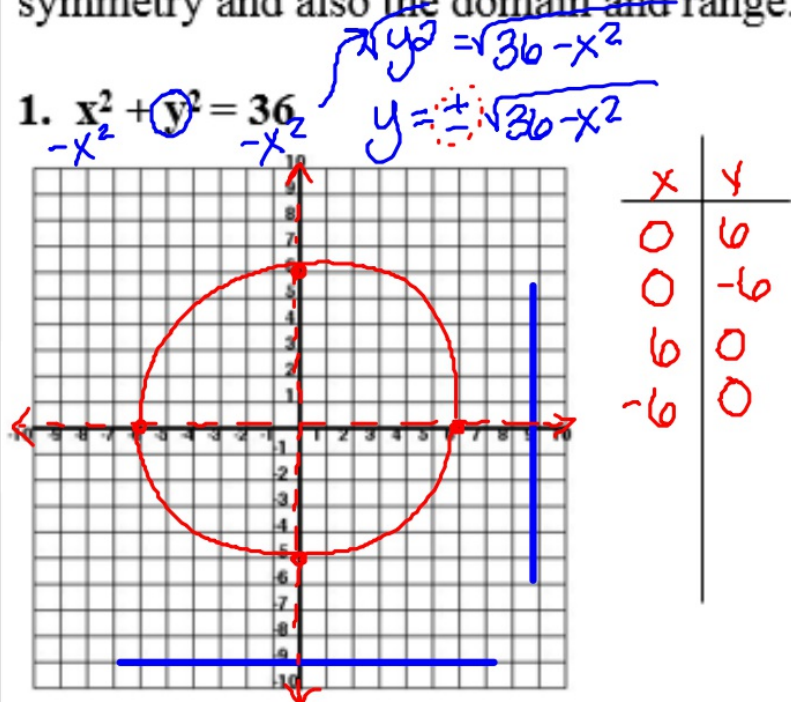


## Graphing a Circle

### Example for you...

Graph the circle below. State the lines of symmetry and also the domain and range.

1.  $x^2 + y^2 = 36$



Lines of Symmetry:  $x=0$  /  $y=0$

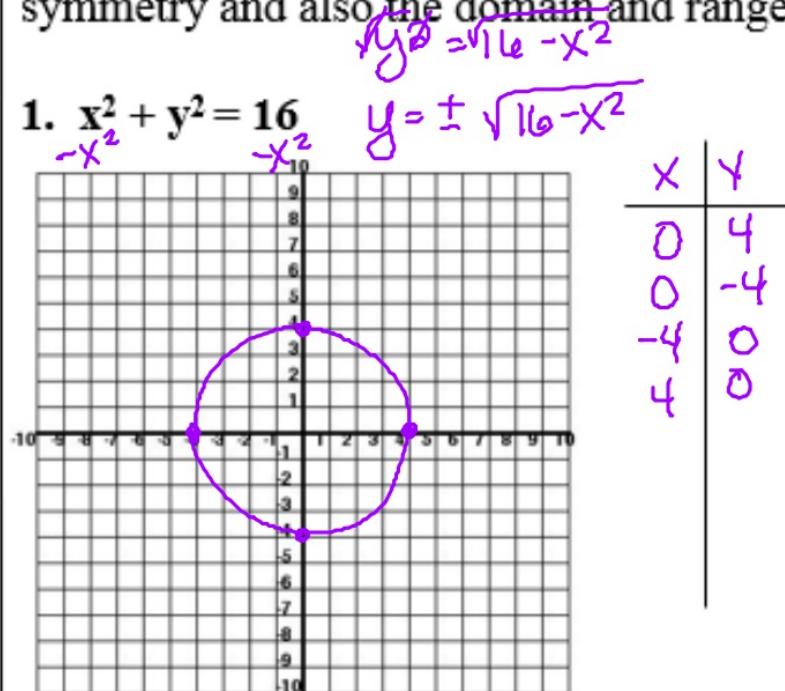
(x-values)  
Domain:  $-6 \leq x \leq 6$

(y-values)  
Range:  $-6 \leq y \leq 6$

### Your turn to try...

Graph the circle below. State the lines of symmetry and also the domain and range.

1.  $x^2 + y^2 = 16$



Lines of Symmetry:  $x=0$  /  $y=0$

Domain:  $-4 \leq x \leq 4$

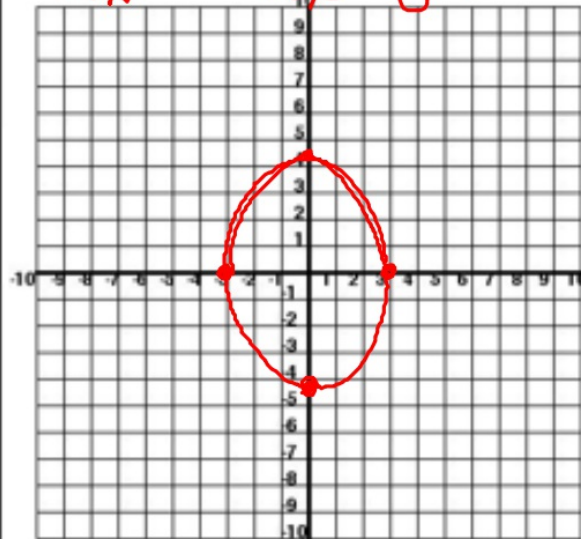
Range:  $-4 \leq y \leq 4$

## Graphing an Ellipse

### Example for you...

The the **ellipse** below. State the lines of symmetry and also the domain and range.

1.  $2x^2 + y^2 = 18$



$\sqrt{y^2} = \sqrt{18 - 2x^2}$   
 $y = \pm \sqrt{18 - 2x^2}$  (2 equations)

x	y
-3	0
3	0
0	4.2
0	-4.2

Lines of Symmetry:  $x=0 / y=0$   
 (x-values)

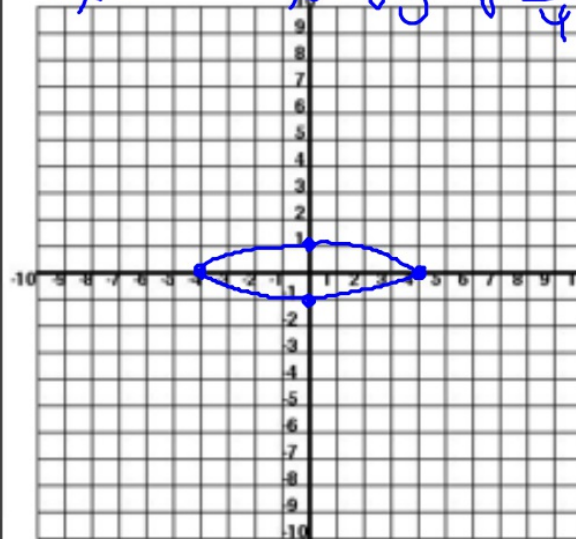
Domain:  $-3 \leq x \leq 3$

Range:  $-4.2 \leq y \leq 4.2$

### Your turn to try...

The the **ellipse** below. State the lines of symmetry and also the domain and range.

1.  $x^2 + 4y^2 = 16$



$\sqrt{y^2} = \sqrt{\frac{16 - x^2}{4}}$   
 $y = \pm \sqrt{\frac{16 - x^2}{4}}$

x	y
-4	0
4	0
0	2
0	-2

Lines of Symmetry:  $x=0 / y=0$

Domain:  $-4 \leq x \leq 4$

Range:  $-2 \leq y \leq 2$

## Graphing a Hyperbola

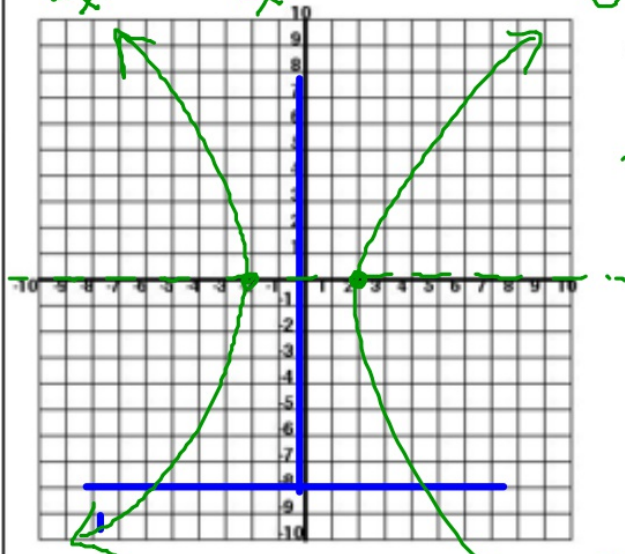
### Example for you...

The the **hyperbola** below. State the lines of symmetry and also the domain and range.

1.  $x^2 - y^2 = 4$

$$-y^2 = 4 - x^2 \quad \sqrt{y^2} = \sqrt{-4 + x^2}$$

$$\frac{-y^2}{-1} = \frac{4 - x^2}{-1} \quad y = \pm \sqrt{4 + x^2}$$



x	y
2	0
-2	0

Lines of Symmetry:  $x=0$  /  $y=0$

Domain:  $\mathbb{R} \geq 2$  and  $\mathbb{R} \leq -2$

Range:  $\mathbb{R}$

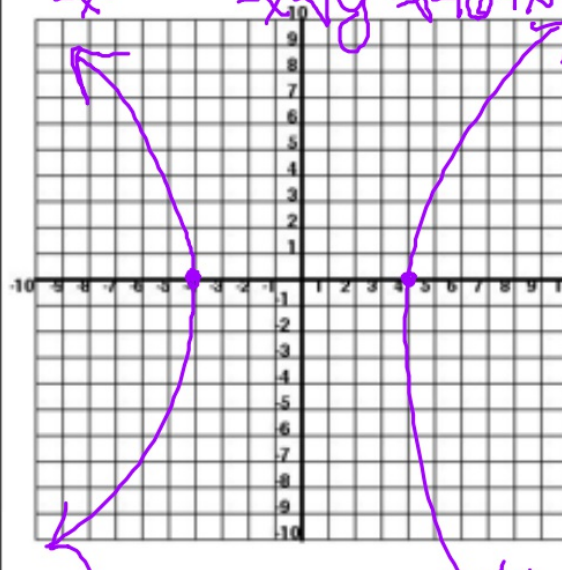
### Your turn to try...

The the **hyperbola** below. State the lines of symmetry and also the domain and range.

1.  $x^2 - y^2 = 16$

$$-y^2 = 16 - x^2 \quad \sqrt{y^2} = \sqrt{-16 + x^2}$$

$$\frac{-y^2}{-1} = \frac{16 - x^2}{-1} \quad y = \pm \sqrt{-16 + x^2}$$



x	y
4	0
-4	0

Lines of Symmetry:  $x=0$  /  $y=0$

Domain:  $\mathbb{R} \geq 4$  and  $\mathbb{R} \leq -4$

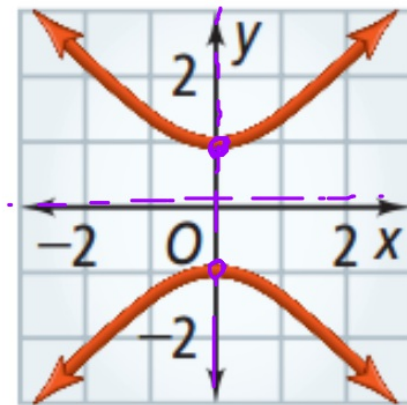
Range:  $\mathbb{R}$

## Identifying Graphs of Conic Sections

### Example for you...

Identify the conic section. Find its lines of symmetry and state its domain and range.

1.



hyperbola

Lines of Symmetry:  $x=0$  /  $y=0$

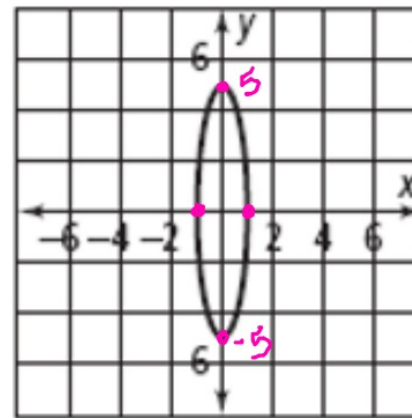
Domain:  $\mathbb{R}$

Range:  $\mathbb{R} \geq 1$  and  $\mathbb{R} \leq -1$

### Your turn to try...

Identify the conic section. Find its lines of symmetry and state its domain and range.

1.



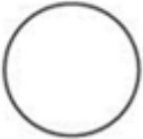




Ellispe!

Lines of Symmetry:  $x=0$  /  $y=0$

Domain:  $-1 \leq \mathbb{R} \leq 1$

Range:  $-5 \leq \mathbb{R} \leq 5$

*More Helpful Information!*

	<b>Circle</b>	<b>Ellipse</b>	<b>Hyperbola</b>
<b>Shape</b>		 or 	 or 
<b>Lines of Symmetry</b>	all lines through the origin	the x-axis and the y-axis	the x-axis and the y-axis
<b>Domain and Range</b>	Domain: all x-values within the circle Range: all y-values within the circle	Domain: all x-values within the ellipse Range: all y-values within the ellipse	Domain: all x-values within the branches Range: all real numbers or Domain: all real numbers Range: all y-values within the branches

## ALG II A ~ CH 10 ~ Quadratic Relations and Conics Sections

Section	Subject	Learning Target	Homework
10.1	Exploring conic sections	<ul style="list-style-type: none"> <li><input type="checkbox"/> To be able to graph a circle using tables.</li> <li><input type="checkbox"/> To be able to graph an ellipse using tables.</li> <li><input type="checkbox"/> To be able to graph a hyperbola using tables.</li> <li><input type="checkbox"/> To be able to identify lines of symmetry.</li> <li><input type="checkbox"/> To be able to identify domain and range.</li> </ul>	Pg. 618 #8 - #32 (EVEN)
10.1 cont.	Exploring conic sections	<ul style="list-style-type: none"> <li><input type="checkbox"/> To be able to identify graphs of conic sections.</li> <li><input type="checkbox"/> To be able to use conic models to solve problems.</li> </ul>	
10.2	Parabolas	<ul style="list-style-type: none"> <li><input type="checkbox"/> To be able to graph parabolas with equation <math>y = ax^2</math>.</li> <li><input type="checkbox"/> To be able to graph parabolas with equation <math>x = ay^2</math>.</li> <li><input type="checkbox"/> To be able to work with the vertex, focus and <u>directrix</u> of a parabola.</li> <li><input type="checkbox"/> To be able to transform a parabola.</li> <li><input type="checkbox"/> To be able to use parabola equations to solve problems.</li> </ul>	