Chapter 10.4-10.6 Notes

3/18/2013	10-4(1): Ellipses	A36: 586(1, 3-24, x 3)
3/19/2013 3/20/2013	10-5(1): Hyperbolas	A37: 595(8, 11-13, 16-17, 20-28 even)
3/21/2013	10-4(2) & 10-5(2)	A38: 586(2, 5, 7, 8) & 597(4-7)
3/22/2013	10-6(1): Conic Sections	A39: 599(1-4, 9-12)

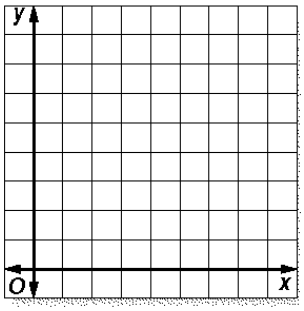
3/25/2013	10-6(2): Conic Sections	A40: 599(5-6, 13-16, 19-22)
3/26/2013 3/27/2013	Review	A41: 612(33-51o skip 37 & 43)
3/28/2013	C10 Test	
3/29/2013	No School	Spring Break

Conic Sections

	Standard Form	Direction	Vertex/ Center	Axes	Foci	Other
Parabola	$y=a(x-h)^2+k$	$a>0$ up $a<0$ down	(h,k)	Axis of Symmetry $x=h$	$\left(h,k+\frac{1}{4a}\right)$	Directrix: $y=k-\frac{1}{4a}$ Latus Rectum: $\left\|\frac{1}{a}\right\|$
	$x=a(y-k)^2+h$	$a>0$ right $a<0$ left	(h,k)	Axis of Symmetry $y=k$	$\left(h+\frac{1}{4a},k\right)$	Directrix: $x=h-\frac{1}{4a}$ Latus Rectum: $\left\|\frac{1}{a}\right\|$
Circle	$(x-h)^2+(y-k)^2=r^2$		(h,k)	Radius $=r$ Diameter $=2r$		
Ellipse $a>b$	$\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$	Horizontal Major Axis ($a>b$)	(h,k)	Major Axis: $2a$ units Minor Axis: $2b$ units	$(h\pm c,k)$ $a^2-b^2=c^2$	
	$\frac{(x-h)^2}{b^2}+\frac{(y-k)^2}{a^2}=1$	Vertical Major Axis ($a>b$)	(h,k)	Major Axis: $2a$ units Minor Axis: $2b$ units	$(h,k\pm c)$ $a^2-b^2=c^2$	
Hyperbola	$\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$	Horizontal Transverse Axis (x^2 is positive)	$(h\pm a,k)$	Transverse Axis: $2a$ Conjugate Axis: $2b$	$(h\pm c,k)$ $a^2+b^2=c^2$	Slope of Asymptotes: $\pm\frac{b}{a}$
	$\frac{(y-k)^2}{a^2}-\frac{(x-h)^2}{b^2}=1$	Vertical Transverse Axis (y^2 is positive)	$(h,k\pm a)$	Transverse Axis: $2a$ Conjugate Axis: $2b$	$(h,k\pm c)$ $a^2+b^2=c^2$	Slope of Asymptotes: $\pm\frac{a}{b}$

§10-4 Ellipses

Goal: _____ and _____ equations of ellipses.



Defns.: ellipse_____

foci _____

major axis _____

minor axis _____

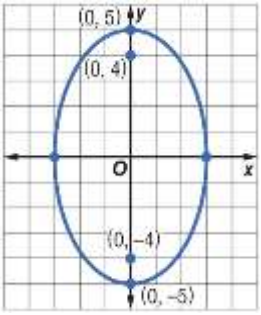
center _____

Standard Form of an ellipse: _____

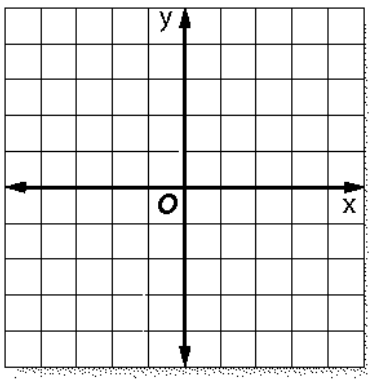
Equations of Ellipses with Centers at the Origin		
Standard Form of Equation		
Direction of Major Axis		
Foci		
Length of Major Axis		
Length of Minor Axis		

Examples:

A) Write an equation for the pictured ellipse.

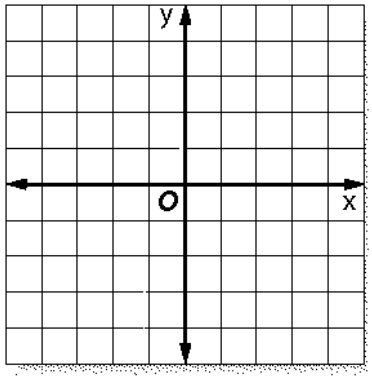


B) Find the coordinates of the center and foci and the lengths of the major and minor axes of the ellipse with equation $\frac{x^2}{36} - \frac{y^2}{9} = 1$. Graph the ellipse.



Equations of Ellipses with Centers at (h, k)		
Standard Form of Equation		
Direction of Major Axis		
Foci		

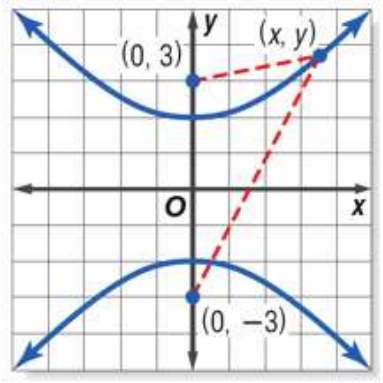
C) Find the coordinates of the center and foci and the lengths of the major and minor axes of the ellipse with equation $x^2 + 4y^2 - 6x - 16y - 11 = 0$. Graph the ellipse.



§10-5: Hyperbolas

Goal: _____ and _____ equations of hyperbolas.

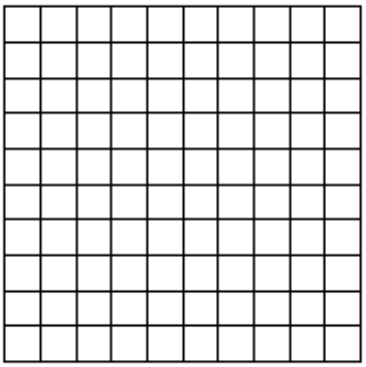
- A _____ is the set of all points in which the _____ of the _____ to the two foci is constant.



- The distance from the center to either vertex is __ units.

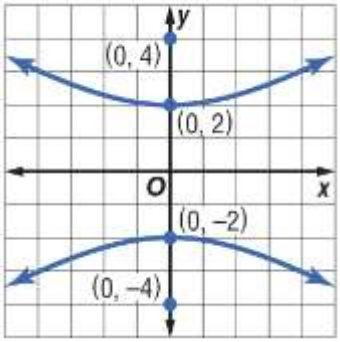
A hyperbola has two axes of symmetry:

- The _____ has endpoints at the vertices.
  Length = ____



- The _____is perpendicular to the transverse axis at the center. Length = ____

Ex.1: Write an equation for the hyperbola shown.



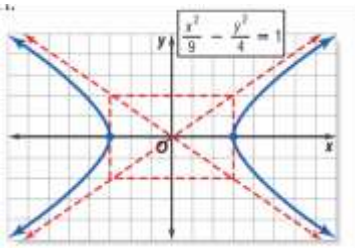
Steps for graphing hyperbolas:

1: Graph the _____.

2: Make an _____ rectangle.

3: Draw the _____ of the rectangle.

4: Draw the _____.



Ex.2: Find the coordinates of the vertices and foci and the equations of the asymptotes for the hyperbola with equation $x^2 - y^2 = 1$. Then, graph the hyperbola.

Ex.3: Find the coordinates of the vertices and foci and the equations of the asymptotes for the hyperbola with equation $x^2 - y^2 + 6x + 10y - 17 = 0$. Then graph the hyperbola.

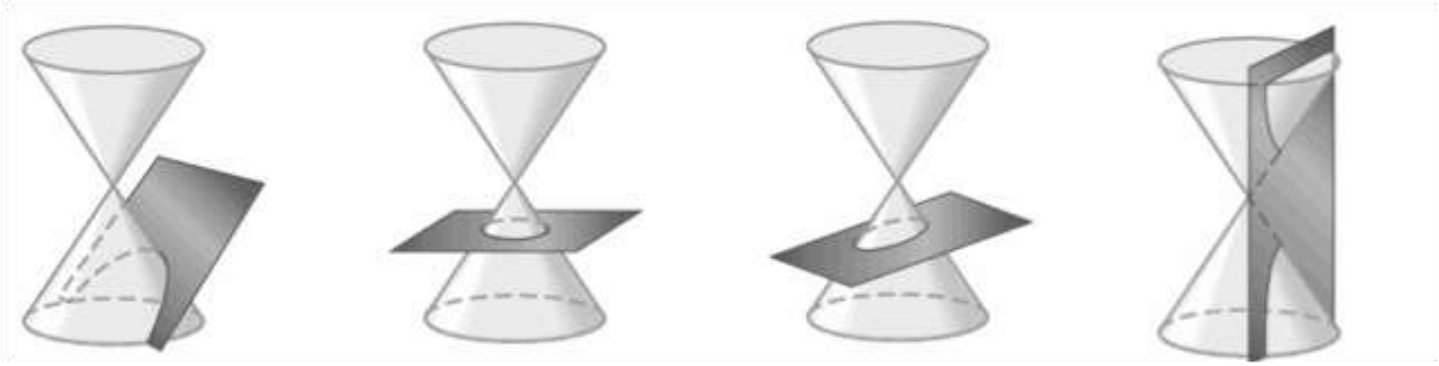
Name_____ Date:_____

§10-6: Conic Sections

Goal 1: Write equations of conic sections in _____ _____.

Goal 2: _____ conic sections from their equations.

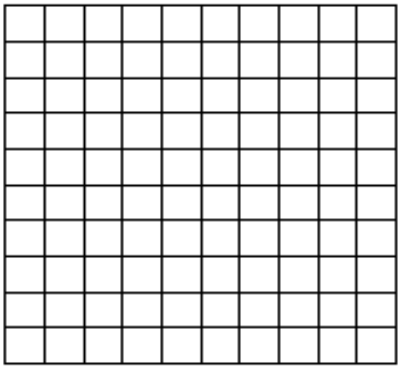
Defn. Conic Section: The _____ _____ of a double cone and a plane.



_____ _____ _____ _____

Defn. General Form of Conic Section: _____

Example 1: Write the equation $y^2 = 18 - 2x^2$ in standard form. State whether the graph of the equation is a *parabola, circle, ellipse,* or *hyperbola.* Graph the equation.



Identifying Conic Sections in General Form	
Conic Section	**Relationship of A and C**
Parabola	
Circle	
Ellipse	
Hyperbola	

Name_____ Date:_____

Example 2: Without writing the equation in standard form, state whether the graph of $3y^2 - x^2 - 9 = 0$ is a parabola, circle, ellipse, or hyperbola. _____

Example 3: Without writing the equation in standard form, state whether the graph of $2x^2 + 2y^2 + 16x - 20y = -32$ is a parabola, circle, ellipse, or hyperbola. _____

Example 4: Without writing the equation in standard form, state whether the graph of $y^2 - 2x - 4y + 10 = 0$ is a parabola, circle, ellipse, or hyperbola. _____

Example 5: Graph $3y^2 - x^2 - 9 = 0$. Label the important features.