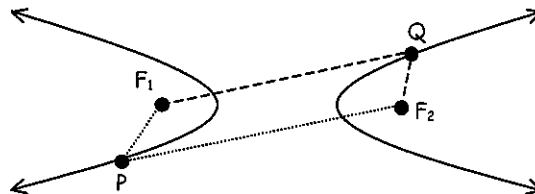


9.3 Notes: Hyperbolas

Definition: The set of all points (locus) in a plane such that the absolute value of the differences of the distance from the two foci is constant.

On the diagram to the right, points P and Q are plotted. They are just two random points. Based on the definition, $|QF_1 - QF_2| = |PF_1 - PF_2|$.



The _____ is the midpoint of the segment that would join the foci.

The foci are _____ units from the center.

The vertices are _____ units from the center.

The _____ are the lines that the curve approaches as it recedes from the center. They also intersect at the center of the hyperbola.

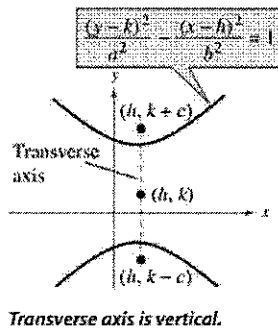
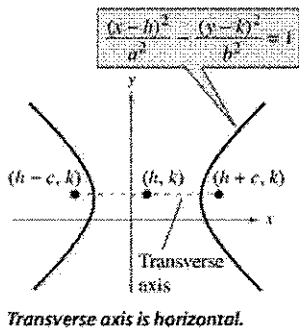
The vertices and the center will always lie on the _____, which is $2a$ units long.

The _____ of a hyperbola is the line segment of length $2b$. It is perpendicular to the transverse axis.

The transverse axis and the conjugate axis intersect at the _____.

To recognize that the equation of a conic is a hyperbola, notice that there are two quadratic terms with _____.

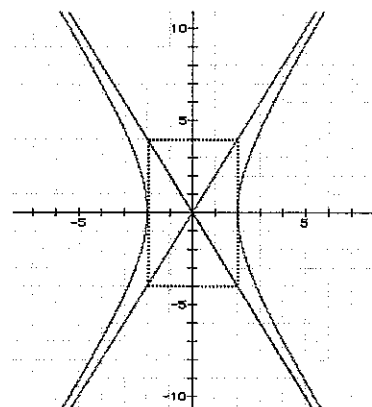
Info about Hyperbolas



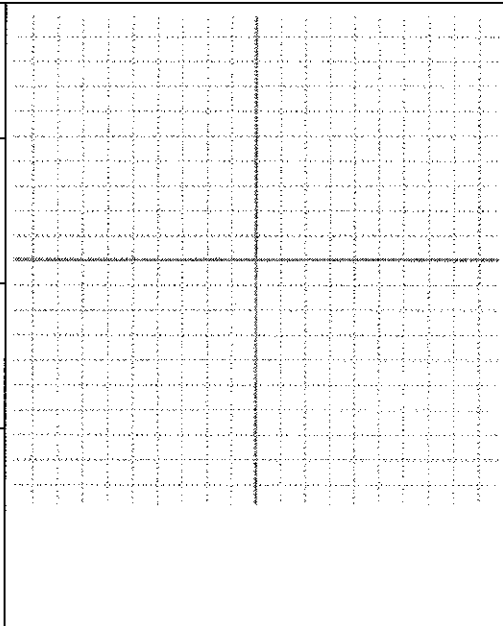
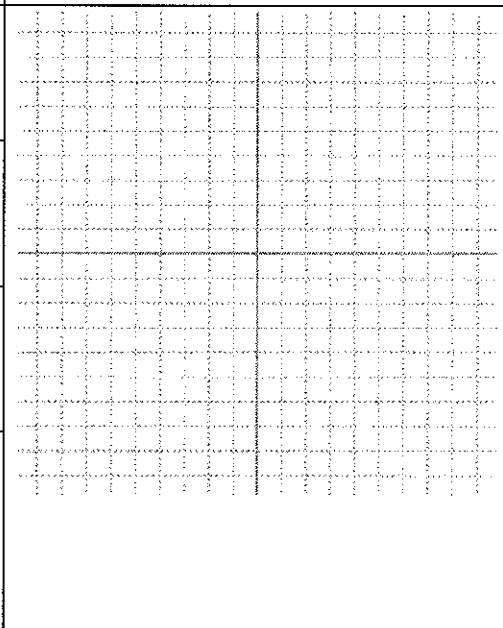
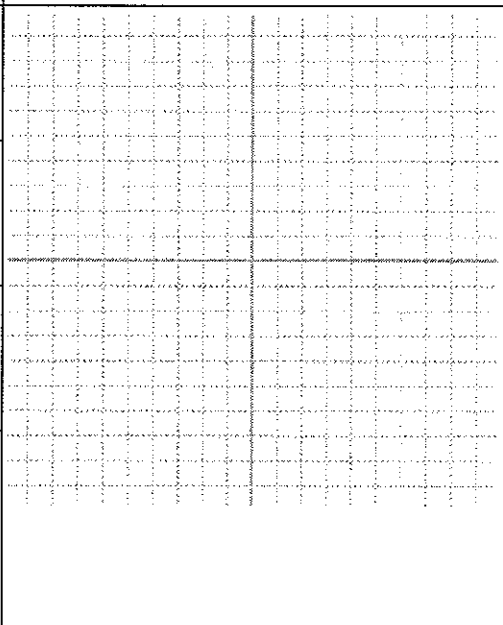
	Horizontal transverse axis (opens left/right)	Vertical transverse axis (opens up/down)
Standard Equation	$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$	$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$
Center	(h, k)	(h, k)
Foci	$(h + c, k)$ and $(h - c, k)$	$(h, k + c)$ and $(h, k - c)$
Vertices	$(h + a, k)$ and $(h - a, k)$	$(h, k + a)$ and $(h, k - a)$
Eqns. of asymptotes	$y = k \pm \frac{b}{a}(x - h)$	$y = k \pm \frac{a}{b}(x - h)$

The relationship among a , b & c can be represented by: $c^2 = a^2 + b^2$

1. Write an equation of the hyperbola shown to the right.



Fill in the information requested and write the equation of the hyperbola in standard form, then draw the graph. Your graphs must include all the listed information.

<p>2. $4x^2 - y^2 = 16$</p>	<p>Center:</p>	
<p>Foci:</p>		
<p>Vertices:</p>		
<p>Eqns. of Asymptotes:</p>		
<p>3. $-3y^2 + 4x^2 + 8x + 16 = 0$</p>	<p>Center:</p>	
<p>Foci:</p>		
<p>Vertices:</p>		
<p>Eqns. of Asymptotes:</p>		
<p>4. $9x^2 - y^2 + 54x + 10y + 55 = 0$</p>	<p>Center:</p>	
<p>Foci:</p>		
<p>Vertices:</p>		
<p>Eqns. of Asymptotes:</p>		