

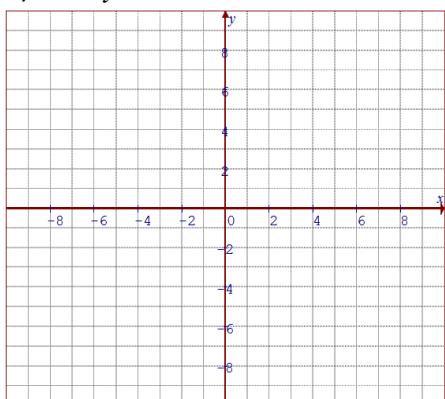
Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Math 10/11 Enriched: Section 7.3 Graphing Hyperbolas**

1. Given each equation below, graph it on the grid provided:

a)  $x^2 - y^2 = 36$



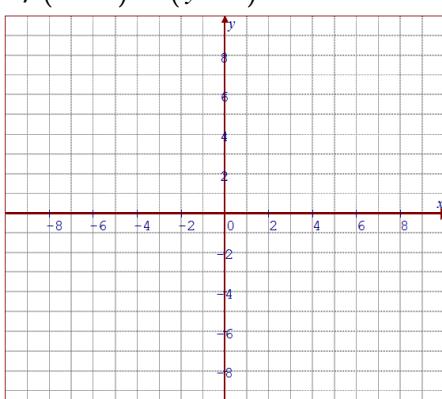
Vertices:

Asymptotes:

Length of Transverse: Foci:

Domain: Range:

b)  $(x+2)^2 + (y+2)^2 = -25$



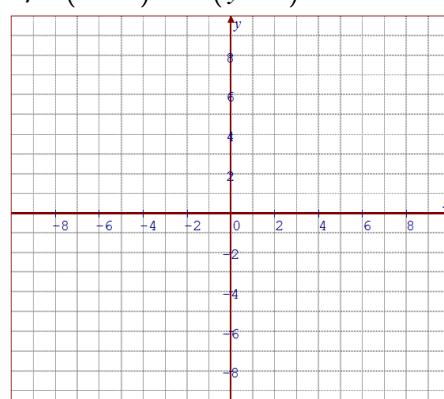
Vertices:

Asymptotes:

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c)  $4(x-2)^2 - 2(y-2)^2 = 200$



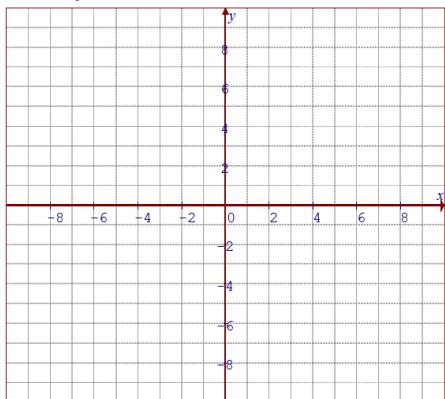
Vertices:

Asymptotes:

Length of Transverse: Foci:

Domain: Range:

d)  $-\frac{x^2}{9} + \frac{y^2}{4} = -1$



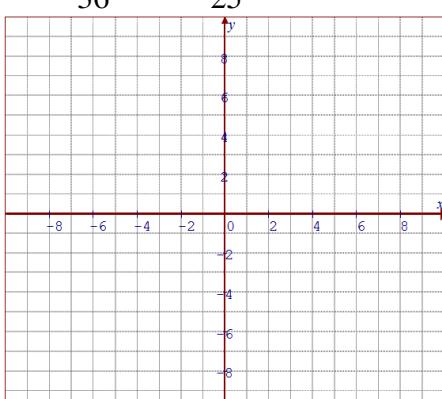
Vertices:

Asymptotes:

Length of Transverse: Foci:

Domain: Range:

e)  $\frac{(x+3)^2}{36} - \frac{(y-4)^2}{25} = 1$



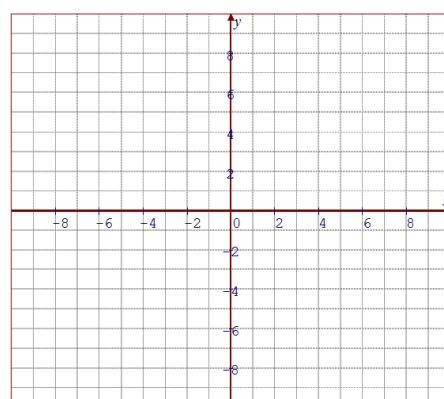
Vertices:

Asymptotes:

Length of Transverse: Foci:

Domain: Range:

f)  $36(x+3)^2 - 49(y-1)^2 = 1764$



Vertices:

Asymptotes:

Length of Transverse: Foci:

Domain: Range:

2. Given each equation in general form, find the equation of the asymptote, location of the foci, and the equation in standard form:

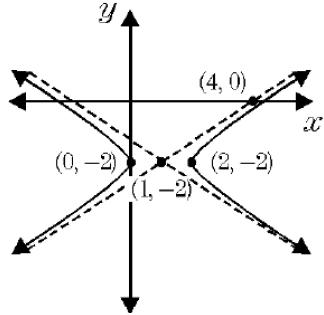
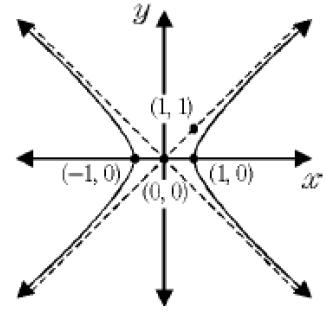
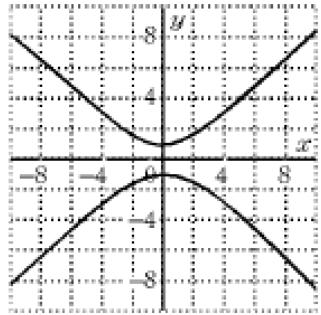
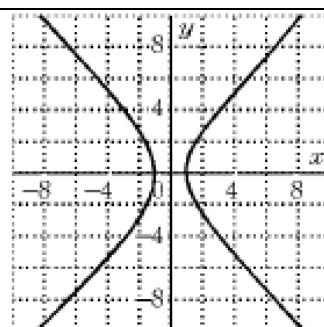
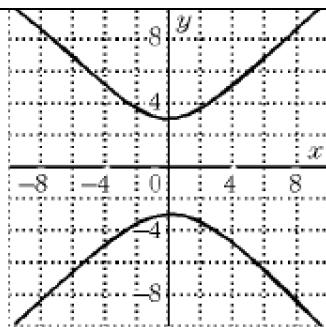
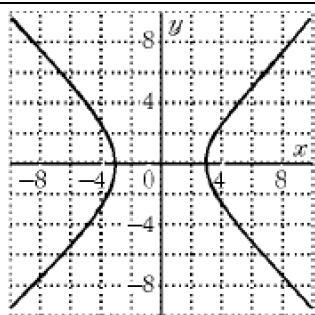
$$2x^2 - 3y^2 + 4x - 4 = 0$$

$$4x^2 - 3y^2 + 8x - 9y + 16 = 0$$

$$-9x^2 + 4y^2 + 54x + 45 = 0$$

$$-4x^2 + 3y^2 - 12x - 12y + 11 = 0$$

3. Given the diagram of each hyperbola, provide an equation that describes it:



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4. A rectangular hyperbola has its centre at (3,5) and one of its vertex at (9,5). What is the equation of the hyperbola?

5. Write the equation of the hyperbola with center at (5,3), vertex at (5,6), one asymptote with equation  $4y - 3x = -3$

6. What are the coordinates, in the form of (x,y) of the center of the hyperbola with equation  $4x^2 - 2y^2 - 16x + 20y = 0$

7. Given rectangle PQRS, with P(2,5), Q(-5,5), S(2,-1), and R(-5,-1), find the equation of the hyperbola whose asymptotes are the diagonals and is tangent to sides PQ and RS.

8. State the coordinates of the vertices, the length of the transverse axis, and the equations of the asymptotes of the hyperbola:  $\frac{(x-3)^2}{16} - \frac{(y-6)^2}{9} = 1$

9. The vertices of a hyperbola are (2,3) and (2,-5). If one of the asymptotes has a slope of 2/3, determine an equation for the hyperbola:

10. A rectangular hyperbola of the form  $y^2 - x^2 = m^2$  has points (3,5) and (-5,z) on the graph. Determine the value of "z"

11. Given an equation in the form of  $Ax^2 + By^2 = 1$ , which value "A" or "B" must be negative in order for it to be an hyperbola with its vertices on the x-axis?

12. Determine the equations of a hyperbola with asymptotes  $y = \pm \frac{4}{3}x + 1$  and the distance between its vertices is 8 units long.

13. A point where both coordinates are integers is known as a lattice point. How many lattice points lie on the parabola:  $x^2 - y^2 = 2000^2$

14. Considering the equation  $Ax^2 + By^2 + C = 0$ . What coordinates must be satisfied by A, B, and C for this equation to represent each of the following conics:

- A circle with centre at the origin
- A rectangular hyperbola with the centre at the origin and vertices on the X-axis
- A rectangular hyperbola with the centre at the origin and vertices on the Y-axis

4. Given rectangle  $PQRS$ , with  $P(2, 5)$ ,  $Q(-5, 5)$ ,  $S(2, -1)$ , and  $R(-5, -1)$ , find the equation of the hyperbola whose asymptotes are the diagonals of the rectangle and is tangent to sides  $PQ$  and  $RS$ .

$$2. \frac{(y-2)^2}{9} - \frac{(x+5)^2}{49} = 1$$

3. Sketch the graphs of these relations on the same grid if possible:

a)  $x^2 + y^2 = 9$       b)  $x^2 + y^2 = 0$       c)  $x^2 + y^2 = -9$

4.