

Hyperbolas

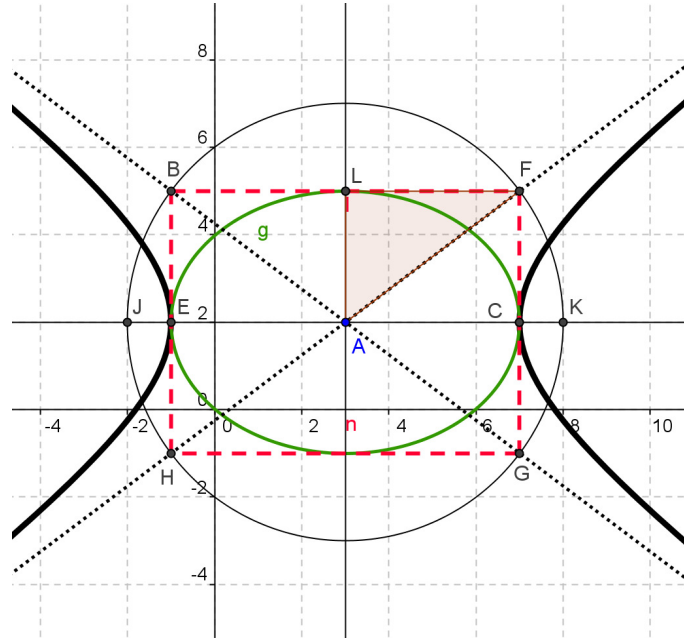
Goal:

- **Graph a hyperbola given an equation.**
- **Identify Vertices, Foci, Transverse Axis, and Conjugate Axis given the equation**

Definition: A hyperbola is the set of all points in the plane in which the difference of the distances from two foci points is constant.

The equation for the hyperbola shown to the right is $\frac{(x-3)^2}{4^2} - \frac{(y-2)^2}{3^2} = 1$

1. Briefly describe the process you would follow to determine the locations of the center and vertices



2. What is the length of segment AK, which represents the distance from the center of the hyperbola to a focus point?
3. What other segment in the diagram possesses the same length as segment AK?
4. Where do the asymptotes intersect?
5. What is the slope of the asymptotes?
6. View the equation of the hyperbola. Where do you see the slope of the asymptotes displayed?

Name: _____

Period: _____

7. Graph the hyperbola that possesses the equation $\frac{(x+2)^2}{1^2} - \frac{(y-1)^2}{2^2} = 1$. Determine the coordinate values of the center, vertices, foci, and asymptotes and list them below.

Center:

Vertices:

Foci:

Asymptotes:



8. Graph the equation $-25x^2 + 16y^2 - 96y + 100x = 356$. (Hint: arrange the equation into standard form by completing the square.) Then determine the values of the hyperbola's Center, Vertices, and Foci and asymptotes.



Center:

Foci:

Vertices:

Asymptotes:

Name: _____

Period: _____

9. Write the equation of a hyperbola that has vertices at $(0,3)$ and $(0,-3)$ and a focus at the point $(0,-9)$. Use the graph to assist you if necessary.



10. The transverse axis has a length of 6 units and the foci are at $(5,2)$ and $(-5, 2)$. Determine the equation of the hyperbola. Use the graph if necessary.



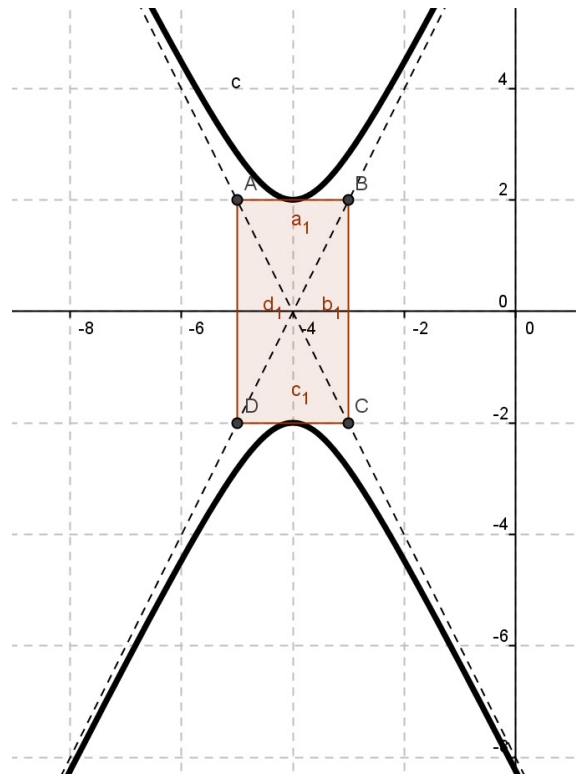
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11. Write the equation of an ellipse that is tangent to the x and y axis and has a center at the ordered pair $(4, -7)$.

Name: _____

Period: _____

12. Determine the equation of the hyperbola displayed at the right.



12. A vertex is at $(4, 5)$ and the center is at $(4, 2)$. The equation of one asymptote is $4y + 4 = 3x$. Determine the equation of the hyperbola.

