

GeoGebra Dynamic
Worksheet: Hyperbola 1

Go to www.doublecrosseducation.com/fetc.htm. Click on Hyperbola 1.
This shows the graph of the hyperbola in the form:

$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$$

You can manipulate the graph by changing the value(s) of h , k , a , and b which are called the **parameters** of the equation. In this worksheet we will examine how each of these parameters changes the graph of the hyperbola.

- *Start with $h = 0$, $k = 0$ and $a = 2$, $b = 3$.*
 1. Write the equation of this hyperbola using the form above.
 2. Write the coordinates of:
 - a) the center
 - b) the vertices and co-vertices

- *Set $h = 0$, $k = 0$, $a = 3$, $b = 2$.*
 3. Write the equation for this hyperbola.
 4. Write the coordinates of:
 - i. the center
 - ii. the vertices and co-vertices

- *Set $h = 2$, $k = 0$, $a = 2$, $b = 3$.*
 5. Write the equation for this hyperbola.
 6. Write the coordinates of:
 - i. the center
 - ii. the vertices

- Set $h = -2, k = -1, a = 2, b = 5$.
7. Write the equation for this hyperbola.
 8. Write the coordinates of:
 - a) the center
 - b) the vertices and co-vertices
 - c) Write the equations for the asymptotes

$$\text{Use } y - k = \pm \frac{b}{a}(x - h)$$

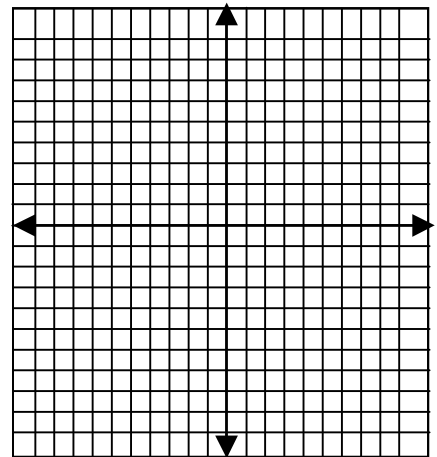
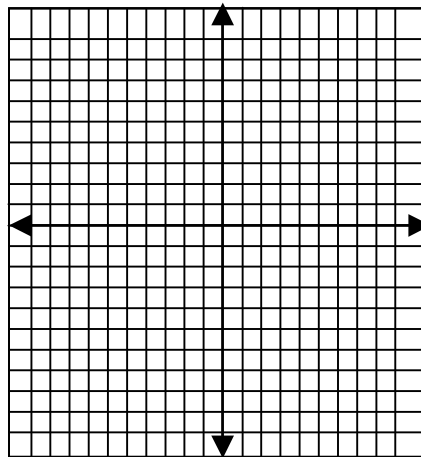
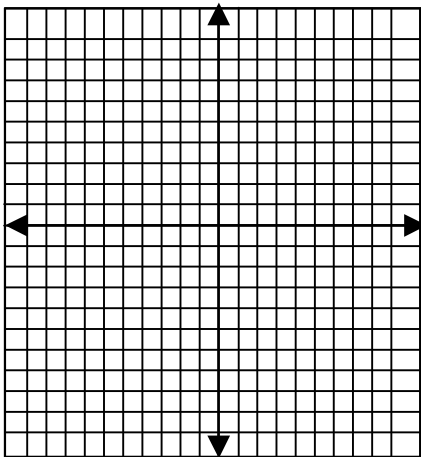
- Summarize how changing the value of h and k , a and b in the equation affects the graph of the hyperbola. Include any effects on the center, vertices, co-vertices, and asymptotes.

Use the Dynamic Worksheet to help you to sketch a graph of each of the hyperbolas below. Show the location of the center, vertices, co-vertices, and asymptotes.

$$9. \frac{x^2}{16} - \frac{(y+2)^2}{4} = 1$$

$$10. \frac{(x+4)^2}{49} - \frac{(y+6)^2}{4} = 1$$

$$11. \frac{(x+3)^2}{49} - \frac{(y-5)^2}{81} = 1$$

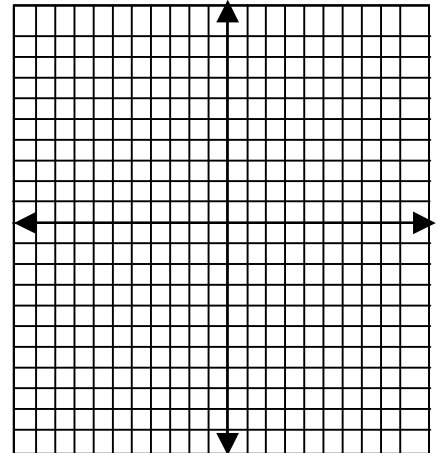
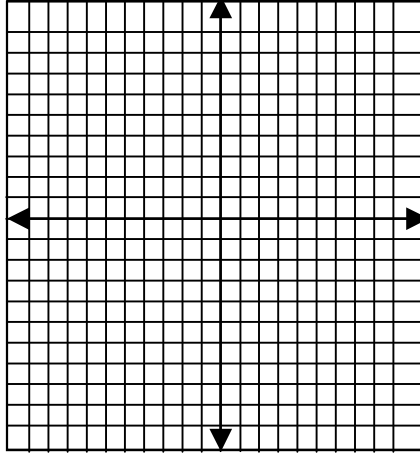
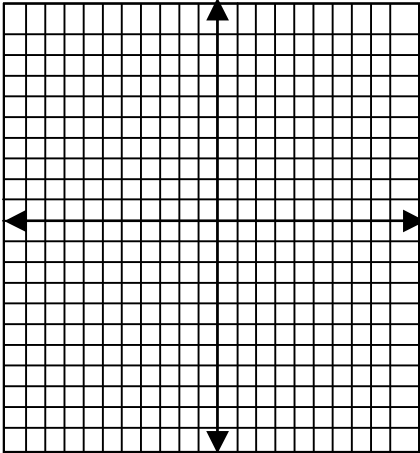


Graph each hyperbola below without using the Dynamic Worksheet.

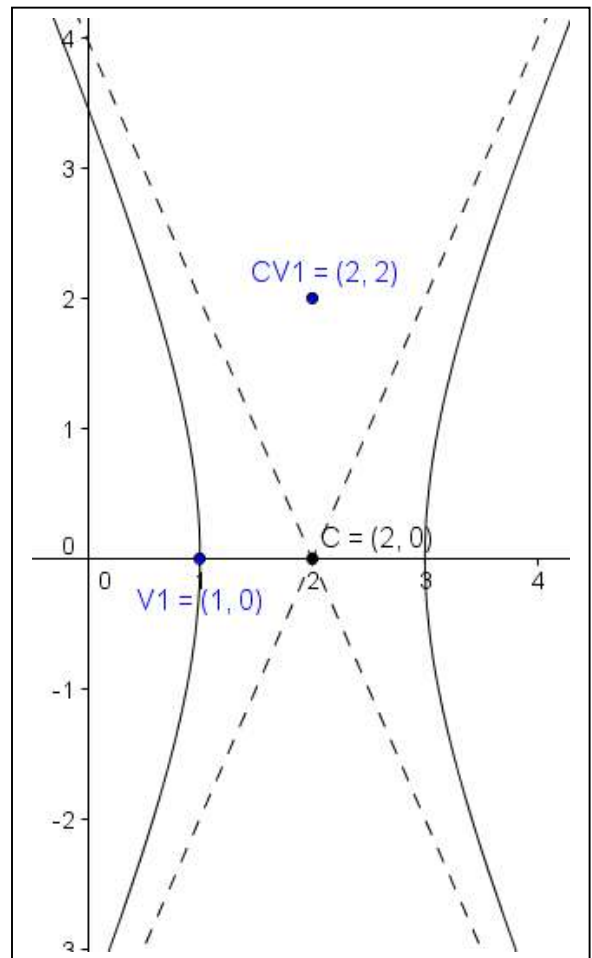
12. $\frac{(x-4)^2}{16} - y^2 = 1$

13. $\frac{(x-2)^2}{64} - \frac{(y-2)^2}{16} = 1$

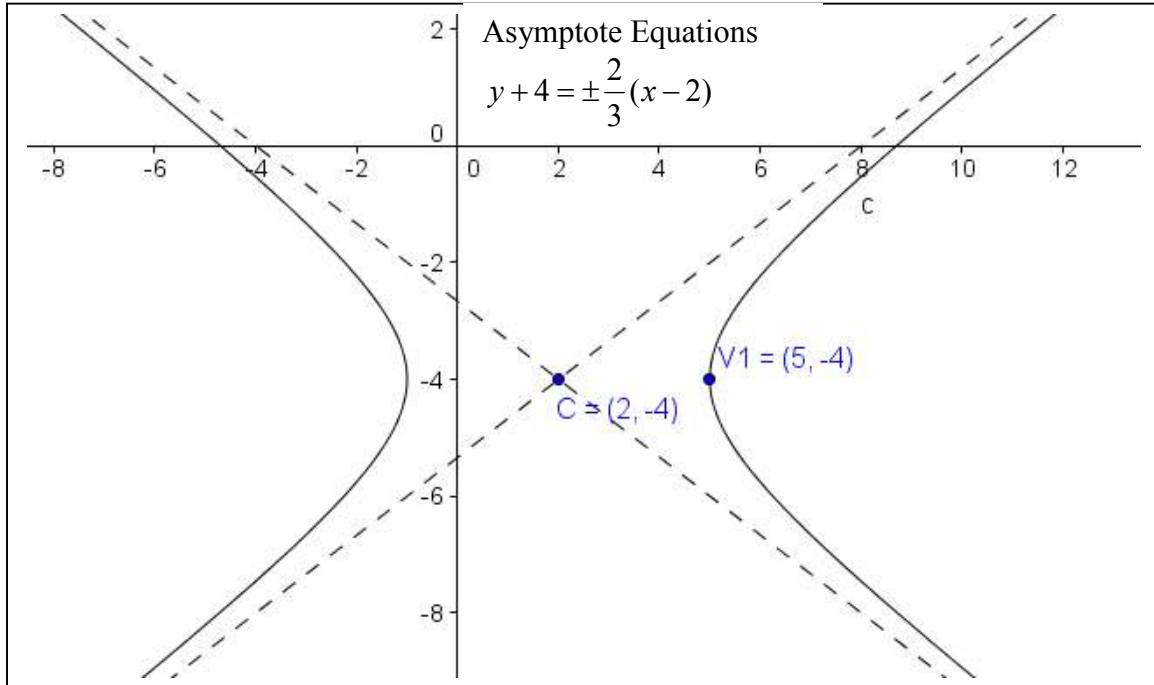
14. $\frac{(x+5)^2}{10} - \frac{(y+3)^2}{16} = 1$



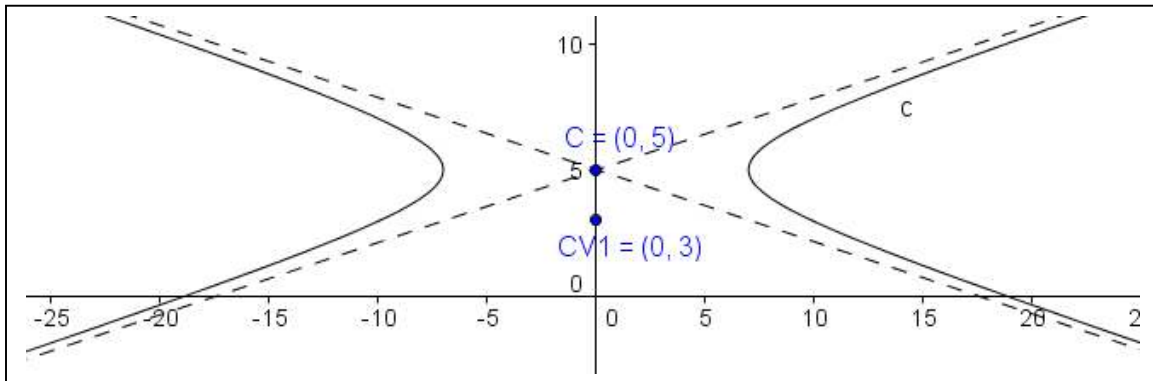
15. Write the equation for the hyperbola shown below. List the center, coordinates of the vertices and co-vertices, and equations of the asymptotes.



16. Write the equation for the hyperbola shown below. List the center, coordinates of the vertices and co-vertices.



17. Write the equation for the hyperbola shown below. List the center, coordinates of the vertices and co-vertices.



Equations of asymptotes: $y - 5 = \pm \frac{2}{7}x$