Hyperbola Notes
Basic Equation Form

Vocabular

- center
- slope
- bounding box
- asymptote
- vertex/vertices
- conjugate axis
- transverse axis

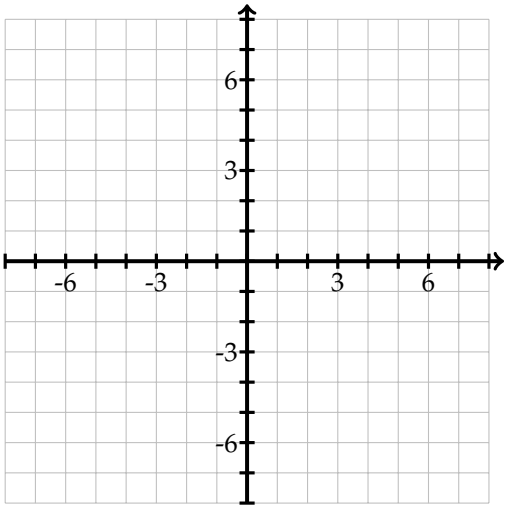
Graphs Could Look Like...

Example Problem With Graph

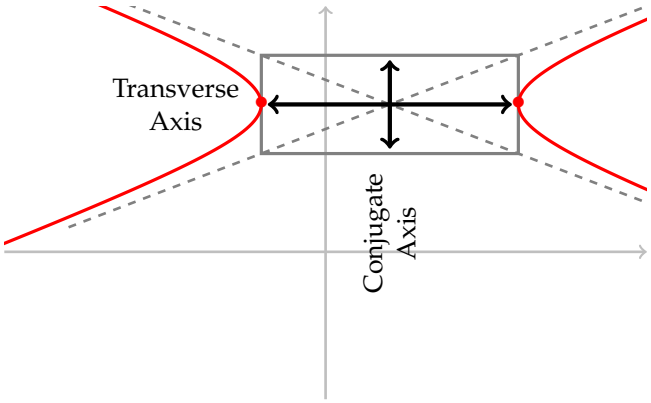
Graph the conic section represented by the equation $\frac{(x+2)^2}{4} - \frac{(y-2)^2}{16} = 1$

Steps...

1. *Identify key information as if this was an ellipse*
2. *Draw a rectangle instead of an ellipse using major and minor numbers.*
3. *Create asymptotes through corners.*
4. *Decide if the hyperbola is vertical or horizontal.*
5. *Follow the asymptotes and pass through the verticies.*



Picture Example



Slope of Asymptote

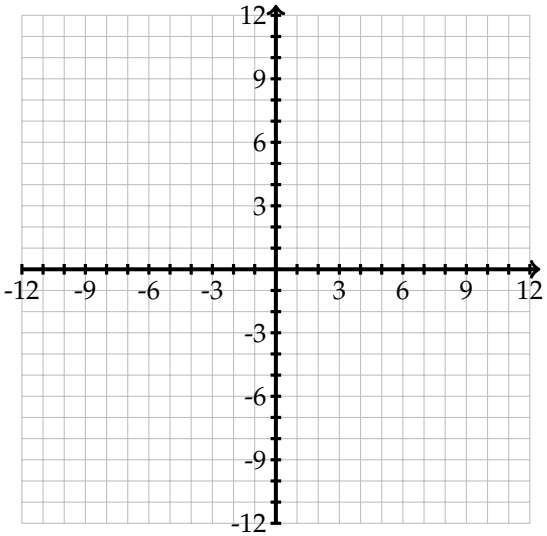
The slope of the asymptote is $\frac{rise}{run}$ where

$$rise = \sqrt{y\text{-bottom value}}$$
$$run = \sqrt{x\text{-bottom value}}$$

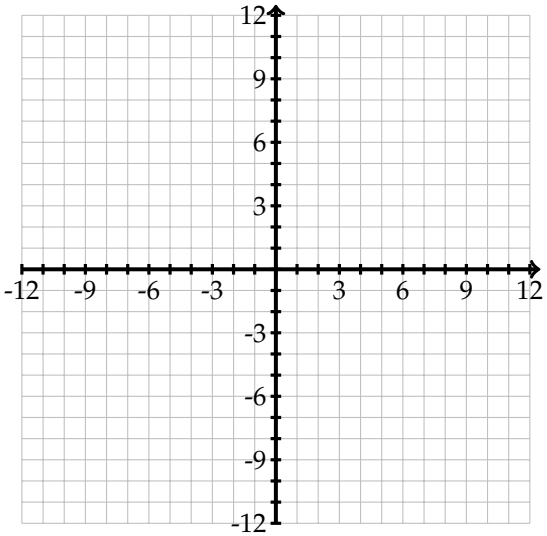
Proving Behavior

Graph each of the hyperbolas on the given graph. Be sure to include the center, asymptotes, slope of the asymptotes, the verticies, as well as the lengths of the transverse axis and conjugate axis.

1. $\frac{x^2}{49} - \frac{y^2}{9} = 1$



2. $\frac{(x+2)^2}{9} - \frac{(y-3)^2}{25} = 1$



3. $\frac{(y-3)^2}{25} - \frac{(x+2)^2}{9} = 1$