I will: be able to graph a hyperbola with the vertex at the origin and solve real work examples involving hyperbolas.

We will: Analyze hyperbolas with the center at the origin and solve application problems involving hyperbolas.
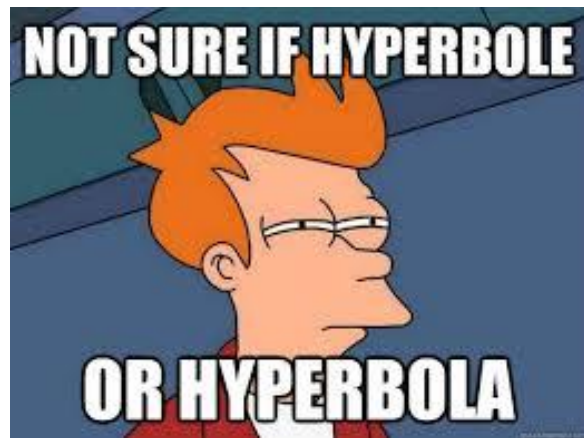
A **hyperbola** is the collection (locus) of all points In the plane, the difference of whose distances from two fixed points, called the foci, is a constant.

Equation of a Hyperbola Centered about the origin with Transverse Axis along the x-axis
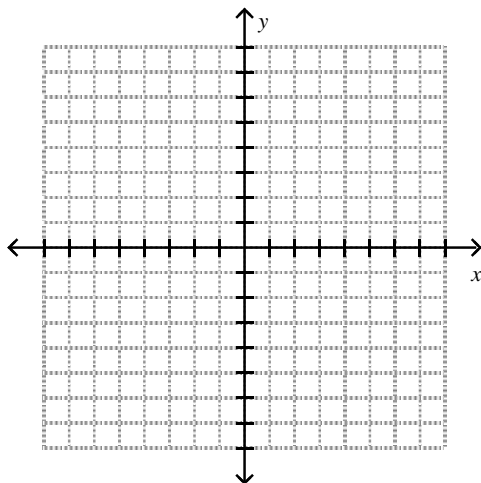
$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

where
$$b^2 = c^2 - a^2$$

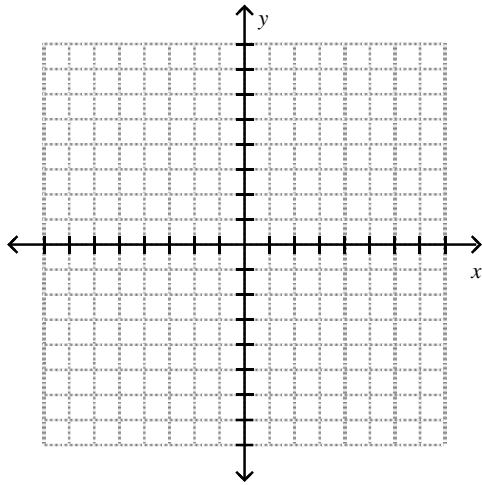**center at $(0,0)$; foci at $(\pm c, 0)$; and vertices at $(\pm a, 0)$**

two oblique asymptotes: $\; y = \pm \dfrac{b}{a} x$

Find an equation of the hyperbola with center at the origin, one focus at $(3, 0)$ and one vertex at $(-2, 0)$. Graph

Analyze the equation; find the center, transverse axis, vertices, and foci. Graph.

$$\frac{x^2}{16} - \frac{y^2}{4} = 1$$

Equation of a Hyperbola; Center at (0, 0); Transverse Axis along the y-axis
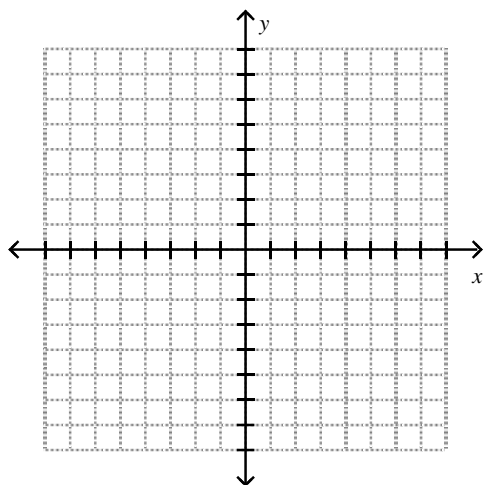
$$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$$

$$b^2 = c^2 - a^2$$

center at $(0,0)$;   foci at $(0, \pm c)$; and vertices at $(0, \pm a)$
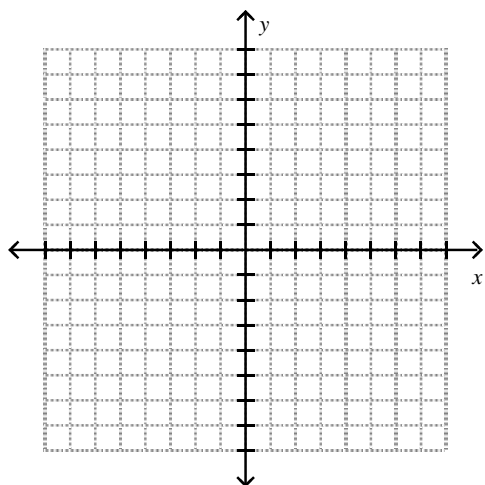
two oblique asymptotes: $y = \pm \dfrac{a}{b} x$

Analyze the equation, find the center, transverse axis, vertices, and foci and graph:
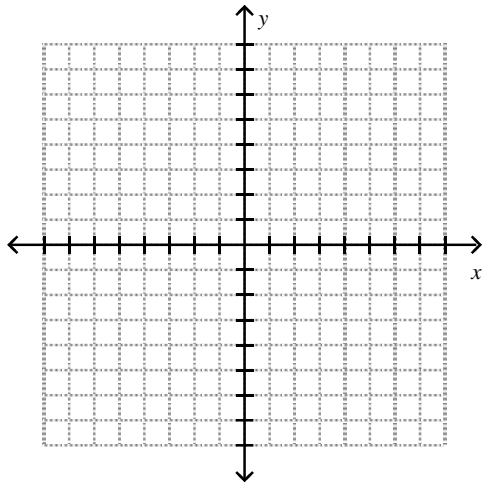$$y^2 - 4x^2 = 4$$

Find an equation of the hyperbola having one vertex at $(0,2)$ and foci at $(0,-3)$ and $(0,3)$. Graph.

Analyze the equation, find the center, transverse axis , vertices, foci, and asymptotes and graph:

$$9x^2 - 4y^2 = 36$$

The homework may ask for the equation of the asymptote. For the quiz and test, all you will be expected to answer is the slope of the asymptote line.