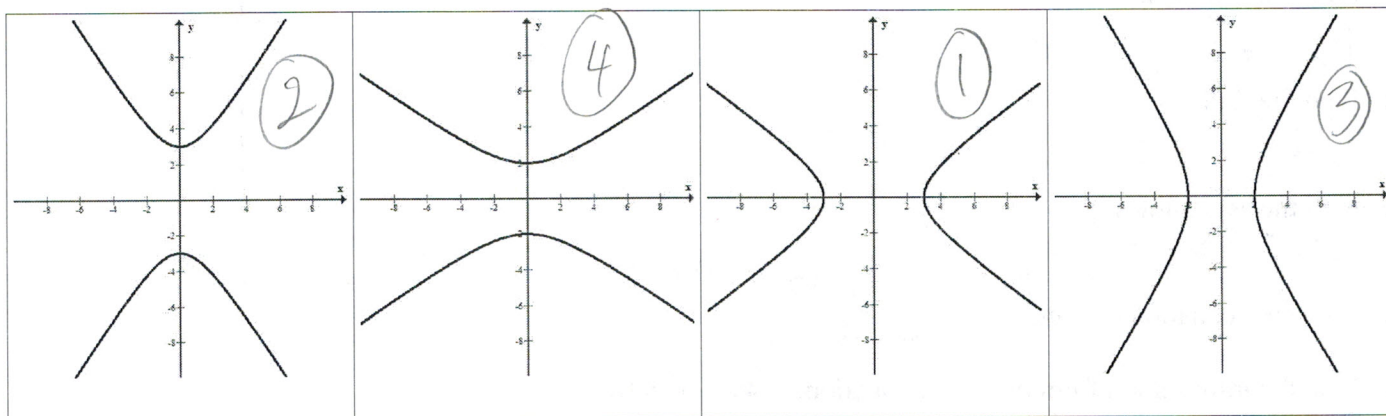


7.4 Practice Problems

Match the equation with the graph.

1. $\frac{x^2}{9} - \frac{y^2}{4} = 1$	2. $\frac{y^2}{9} - \frac{x^2}{4} = 1$
3. $\frac{x^2}{4} - \frac{y^2}{9} = 1$	4. $\frac{y^2}{4} - \frac{x^2}{9} = 1$



5. Find an equation of the hyperbola described. Graph the equation by hand.

Center at (0,0); focus at (0,4); vertex at (0,3)

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

$$b^2 = 16 - 9$$

$$b^2 = 7$$

$$b = \sqrt{7}$$

$$c = 4$$

$$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$$

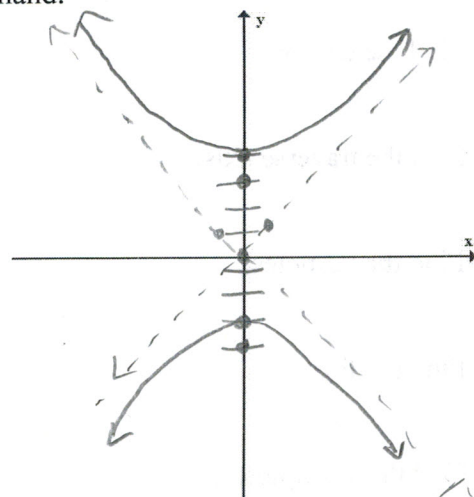
$$\frac{y^2}{9} - \frac{x^2}{7} = 1$$

$$a = 3$$

$$y = \pm \frac{a}{b} x$$

$$y = \pm \frac{3}{\sqrt{7}} x$$

$$y = \pm 1.13$$



6. Find an equation of the hyperbola described. Graph the equation by hand. Center at (-3,1); focus at (-3,6); vertex at (-3,4)

$$c = 5$$

$$a = 3$$

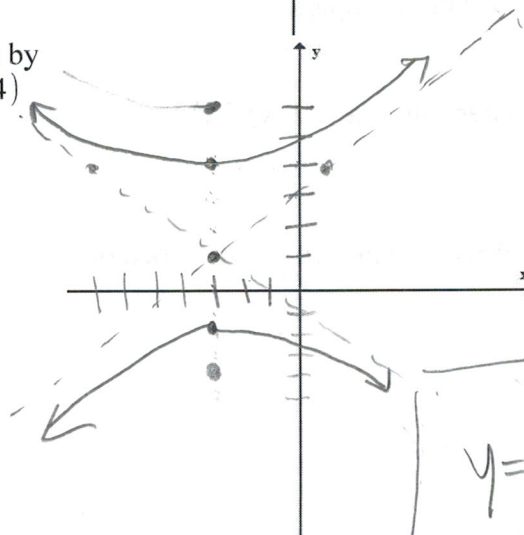
$$\frac{(y-1)^2}{9} - \frac{(x+3)^2}{25} = 1$$

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

$$b^2 = 25 - 9$$

$$b^2 = 16$$

$$b = 4$$



Shift to center

$$y = \pm \frac{a}{b} x$$

$$y = \pm \frac{3}{4} x$$

asymptotes at origin

7. Find the information from the given equation. $\frac{(y-2)^2}{49} - \frac{(x+3)^2}{4} = 1$

a. Find the center.
 $(-3, 2)$

b. Find the traverse axis.
 $x = -3$

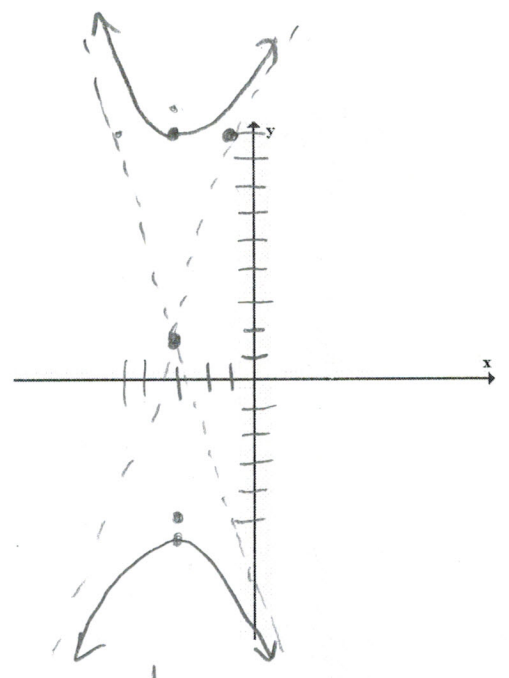
c. Find the vertices.
 $(-3, 9), (-3, -5)$

d. Find the foci.
 $(-3, 2 - \sqrt{53}), (-3, 2 + \sqrt{53})$

e. Find the asymptotes.
 $y = \pm \frac{7}{2}x$ ← If centered at origin

f. Graph the equation by hand.
 $y - 2 = \pm \frac{7}{2}(x + 3)$ ← centered at $(-3, 2)$

$a = 7$ $b = 2$
 $b^2 = c^2 - a^2$
 $c^2 = a^2 + b^2$
 $c^2 = 49 + 4$
 $c^2 = 53$
 $c = \sqrt{53}$



8. Find the information from the given equation. $\frac{4y^2}{16} - \frac{x^2}{16} = 16$

a. Rewrite the equation in the proper form.
 $\frac{y^2}{4} - \frac{x^2}{16} = 1$

b. Find the center.
 $(0, 0)$

c. Find the traverse axis.
 $x = 0$

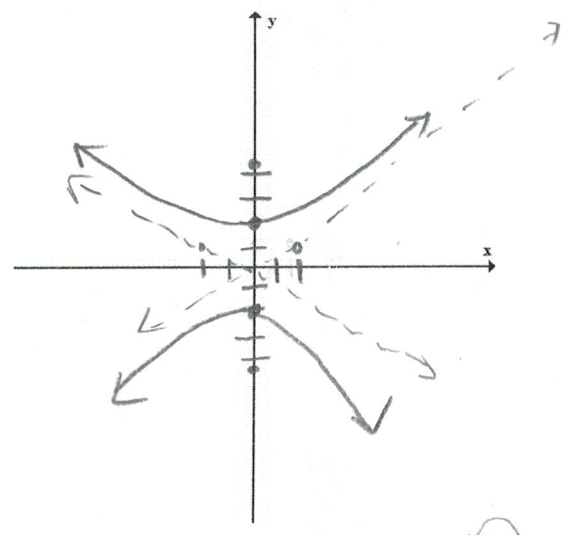
d. Find the vertices.
 $(0, 2), (0, -2)$

e. Find the foci.
 $(0, \sqrt{20}), (0, -\sqrt{20})$

f. Find the asymptotes.
 $y = \pm \frac{2}{4}x = \pm \frac{1}{2}x$

g. Graph the equation by hand.

$a = 2$ $b = 4$
 $c^2 = a^2 + b^2$
 $c^2 = 16 + 4$
 $c^2 = 20$
 $c = \sqrt{20} = 2\sqrt{5}$



9. Write an equation for the hyperbola.

traverse axis = x-axis

$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$

$\frac{x^2}{4} - \frac{y^2}{36} = 1$

