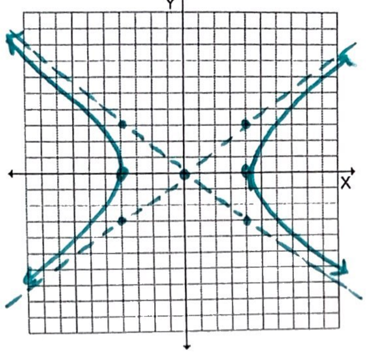
Precalculus: 8.4 Hyperbola Homework

Name ____________________

Standard form of a hyperbola: $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$

1-4: For the equation of the hyperbola find the coordinates of the center and vertices and graph the hyperbola.

1. $\frac{x^2}{16} - \frac{y^2}{9} = 1$

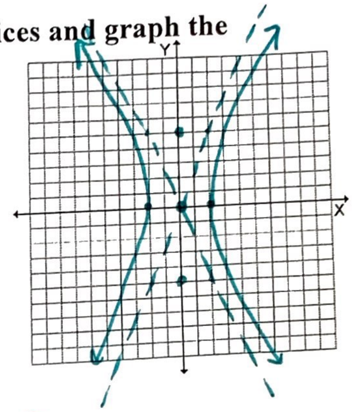


Center: (0,0)

Vertices: (4,0) & (−4,0)

Slope of asymptotes: ±3/4

2. $\frac{x^2}{4} - \frac{y^2}{25} = 1$

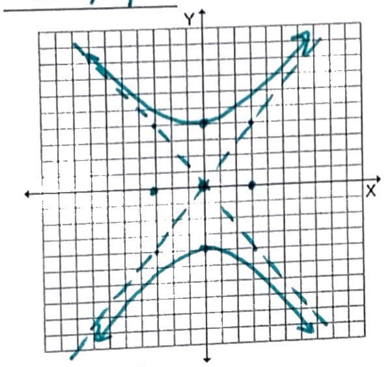


Center: (0,0)

Vertices: (2,0) & (−2,0)

Slope of asymptotes: ±5/2

3. $\frac{y^2}{16} - \frac{x^2}{9} = 1$

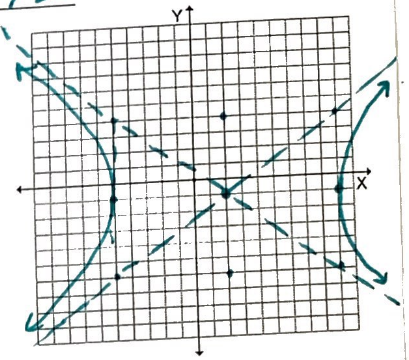


Center: (0,0)

Vertices: (0,4) & (0,−4)

Slope of asymptotes: ±4/3

4. $\frac{(x-2)^2}{49} - \frac{(y+1)^2}{25} = 1$



Center: (2,−1)

Vertices: (9,−1) & (−5,−1)

Slope of asymptotes: ±5/7

#5-7: For the equation of the hyperbola, find the coordinates of the center and foci.

5. $\frac{x^2}{16} + \frac{y^2}{49} = 1$

Center: (0,0)

Foci: ____________

Vertices: (4,0)
(−4,0)

6. $\frac{(x-3)^2}{100} + \frac{(y-8)^2}{9} = 1$

Center: (3,8)

Foci: ____________

Vertices: (13,8)
(−7,8)

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

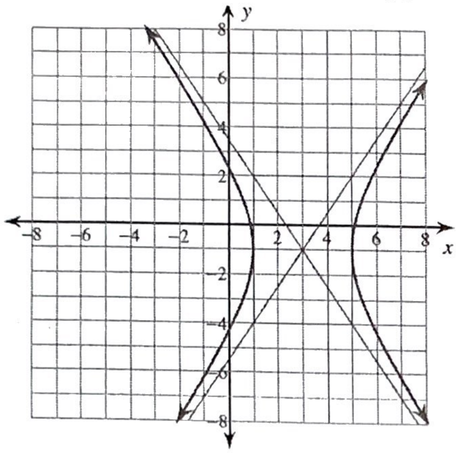
Center: (0,1)

Foci: ____________

Vertices: (3,1)
(−3,1)

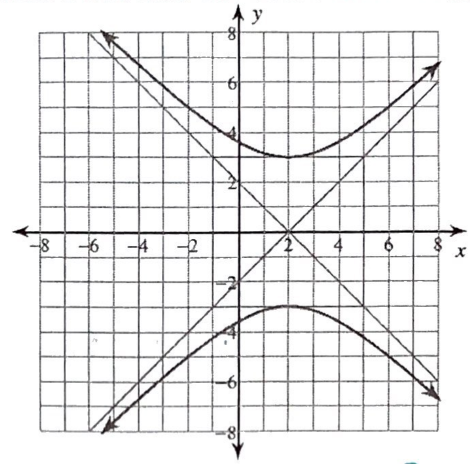
#8-9: Write the equation of each hyperbola in standard form. Then find the coordinates of its foci.

8.



$$\frac{(x-3)^2}{4} - \frac{(y+1)^2}{9} = 1$$

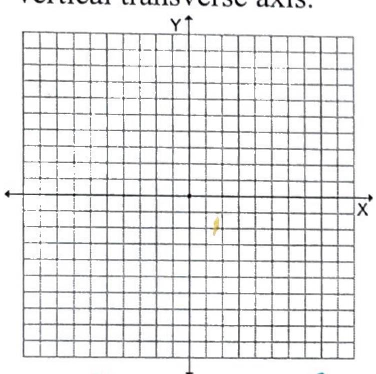
9.



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

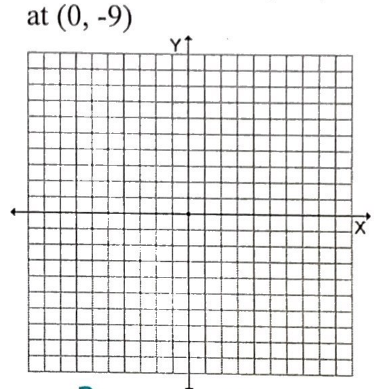
#10-11: Write the equation of the hyperbola that meets each set of conditions.

10. The center is at (4, -2), a = 2, b = 3, and it has a vertical transverse axis.



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

11. The vertices are at (0, 3) and (0, -3) and a focus is at (0, -9)



$$\frac{y^2}{9} - \frac{x^2}{72} = 1$$

#12-13: For the equation of each hyperbola find the coordinates of the center and vertices.

12. $-25x^2 + 16y^2 + 100x - 96y - 356 = 0$

$$\frac{(y-3)^2}{25} - \frac{(x-2)^2}{16} = 1$$

center: (2,3)

vertices: (2,8) & (2,-2)

13. $36x^2 - 49y^2 - 72x - 294y = 2169$

$$\frac{(x-1)^2}{49} - \frac{(y+3)^2}{36} = 1$$

center: (1,-3)

Vertices: (8,-3) & (-6,-3)