

Hyperbolas – Center NOT at Origin

Identify the center, vertices, foci, asymptotes, and the direction of the transverse axis.

Ex. $\frac{(x-2)^2}{9} - \frac{(y+4)^2}{25} = 1$

Center is at (2, -4)

$$a = 3, b = 5, c = \sqrt{a^2 + b^2} = \sqrt{34}$$

Foci $(2 + \sqrt{34}, -4)$ and $(2 - \sqrt{34}, -4)$

Vertices $(5, -4)$ and $(-1, -4)$

Eqns Asymptotes: $y+4 = \pm \frac{5}{3}(x-2)$

$$3y + 12 = 5x - 10$$

$$5x - 3y - 22 = 0 \text{ and}$$

$$5x + 3y + 2 = 0$$

1. Graph the hyperbola with equation

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

2. Graph the hyperbola with equation

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

3. Graph the hyperbola with equation

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

4. Graph the hyperbola with equation

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

5. Graph the hyperbola with equation

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

6. Graph the hyperbola with equation

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

7. Graph the hyperbola with equation

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

8. Graph the hyperbola with equation

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

9. Graph the hyperbola with equation

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

10. Graph the hyperbola with equation

$$\frac{(x-1)^2}{16} - \frac{(y+3)^2}{4} = 1$$