

Deriving Equations of Hyperbolas

* apply same process as ellipses *

Ex 1 foci $(-3,0)(3,0)$
vertices $(-2,0)(2,0)$

find center, use midpoint formula: $(\frac{-2+2}{2}, \frac{0+0}{2}) = (0,0)$

Center $(0,0)$

$$\frac{x^2}{2^2} - \frac{y^2}{5} = 1$$

Change in Center $(0,0)$

vertices $(-2,0) = 2 \rightarrow$

\rightarrow to find b^2 , use foci
 $c = 3$

$$a^2 + b^2 = c^2$$

$$2^2 + b^2 = 3^2$$

$$4 + b^2 = 9$$

$$b^2 = 5 \quad b = \sqrt{5}$$

Ex # 2

vertices $(-5,16)(-5,4)$

conjugate axis is 18 units long

conjugate \rightarrow minor

center: $(\frac{16+4}{2}, \frac{20}{2}) = (-5,10)$

conjugate: $\frac{18}{2} = 9^2 = 81$

center: $(-5,10)$

vert: $(-5,16)$

10 to 16 = 6

$$\frac{(y-10)^2}{36} - \frac{(x+5)^2}{81} = 1$$

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