

## NOTES - Hyperbola

WRITE THE EQUATION

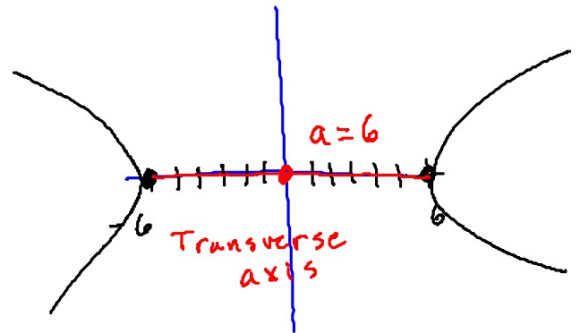
$$\text{Vertices } (\pm 6, 0) \rightarrow a=6$$

$$\text{Foci } (\pm 2\sqrt{10}, 0) \rightarrow c=2\sqrt{10}$$

Center  $(0, 0)$

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

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



$$c^2 = a^2 + b^2$$
$$(2\sqrt{10})^2 = 6^2 + b^2$$

$$4 \cdot 10$$
$$40 = 36 + b^2$$

$$\boxed{4 = b^2}$$

(2) Vertices  $(0, \pm 2)$   $\rightarrow a = 2$

Foci  $(0, \pm 2\sqrt{5})$   $\rightarrow c = 2\sqrt{5}$

Center  $(0, 0)$

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

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

$$c^2 = a^2 + b^2$$
$$(2\sqrt{5})^2 = 2^2 + b^2$$

$$20 = 4 + b^2$$

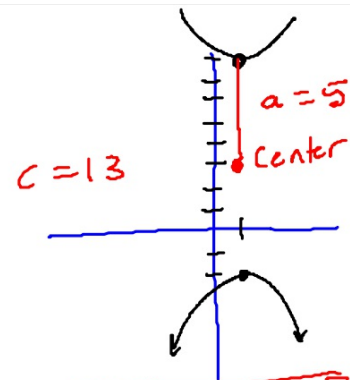
$$\boxed{16 = b^2}$$

(3) Vertices  $(1, -2)$   $(1, 8)$   
Foci  $(1, -10)$   $(1, 16)$

Center  $(1, 3)$

$$\frac{(y-3)^2}{25} - \frac{(x-1)^2}{144} = 1$$

$\frac{-2+8}{2}$



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

$$13^2 = 5^2 + b^2$$

$$169 = 25 + b^2$$

$$\begin{array}{r} -25 \\ \hline 144 = b^2 \end{array}$$

$$144 = b^2$$

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