

Hyperbola: Sec. 9.2

General Form: $Ax^2 + Bx - Cy^2 + Dy + E = 0$

Standard form: $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$ ← This must be equal to 1.

The x^2 portion is positive,
so the hyperbola crosses over the x -axis.
Transverse axis is horizontal.

center : (h, k)

The line segment connecting the vertices is the transverse axis.

The foci are c units from the center,

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

Asymptotes : $y = k \pm \frac{b}{a}(x - h)$

Hyperbola: Sec. 9.3

General

$$Ay^2 + By - Cx^2 + Dx + E = 0$$

Form:

$$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1 \quad \leftarrow \text{This must be equal to 1.}$$

Standard

form:

The y^2 portion is positive,
so the hyperbola crosses over the y -axis.

Transverse axis is vertical.

center : (h, k)

The line segment connecting the vertices is the transverse axis.

The foci are c units from the center,

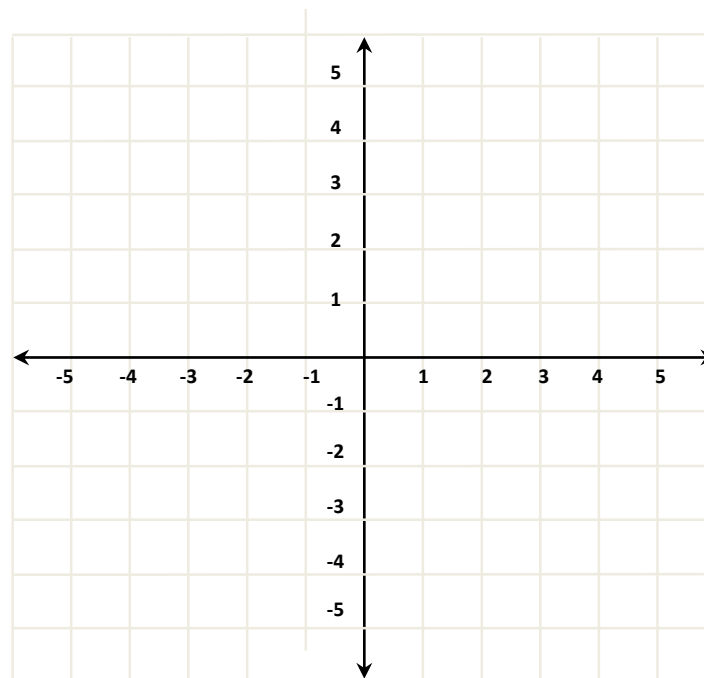
where $c^2 = a^2 + b^2$

Asymptotes : $y = k \pm \frac{a}{b}(x - h)$

Ex. 1) Find the standard form of the equation, the center, vertices, foci, and asymptotes of the hyperbola.

Then sketch the hyperbola, labeling these parts.

$$x^2 - 9y^2 + 36y - 72 = 0$$



Ex. 2) Find the standard form of the equation, the center, vertices, foci, and asymptotes of the hyperbola.

Then sketch the hyperbola, labeling these parts.

$$9y^2 - 4x^2 - 18y + 24x - 63 = 0$$

