Name _____

Parts of a Hyperbola and Its Equation

Date _____ Period _____

What is a Hyperbola?

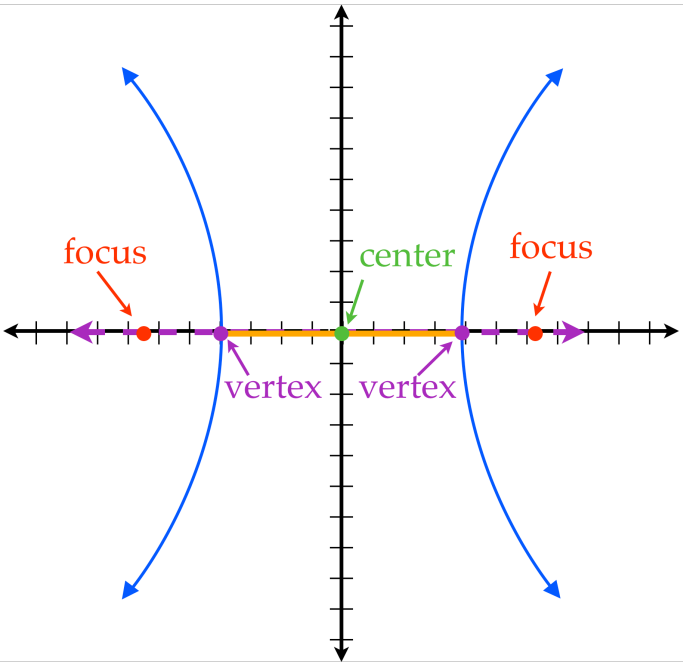
Hyperbola - the set of points such that the difference of the distances from two given points stays the same.

The given points are focus points.
The plural of focus is foci.

The midpoint of the segment joining the two foci is the center of the hyperbola.

Vertices occur at the intersection of line joining the foci and the hyperbola.

Transverse Axis is the segment that joins the two vertices.



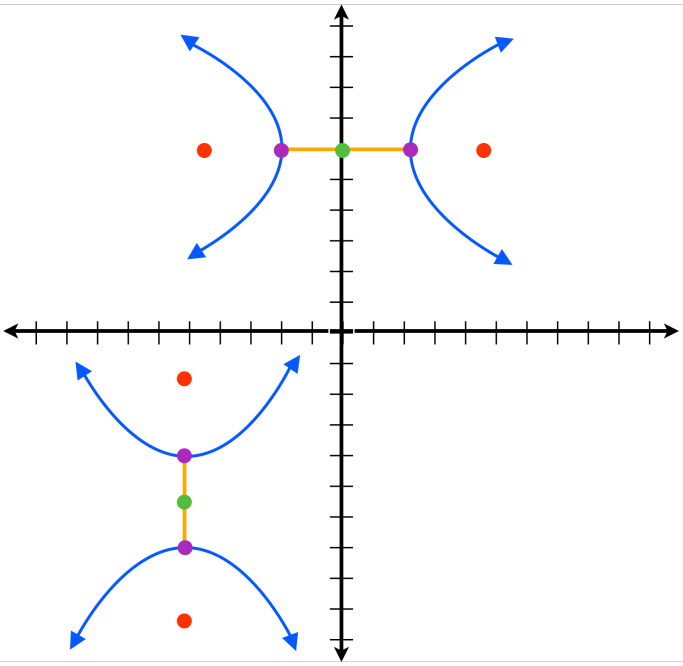
What is a Hyperbola?

Horizontal Hyperbola

the transverse axis runs horizontally
opens left and right

Vertical Hyperbola

the transverse axis runs vertically
opens up and down



The Equation of a Hyperbola?
with center (h,k)

Horizontal Hyperbola
the transverse axis runs horizontally

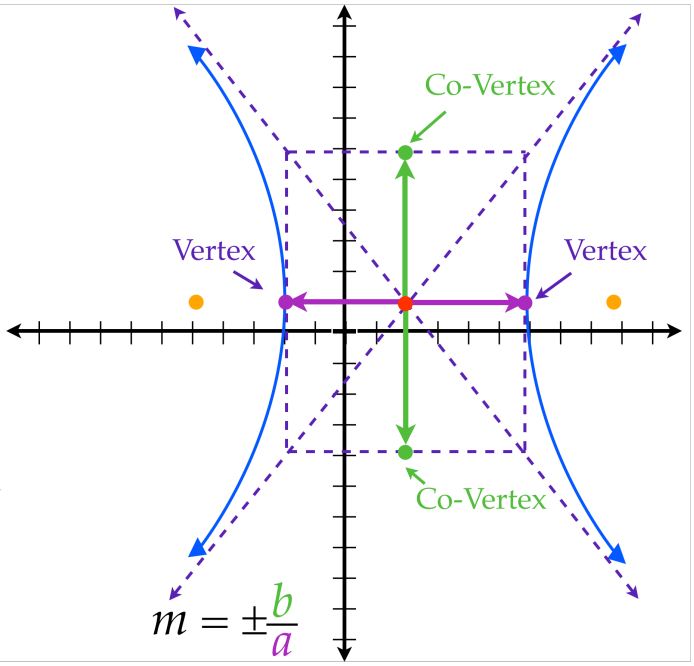
$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$$

a is the distance you travel in the x-direction.

b is the distance you travel in the y-direction.

Foci: $a^2 + b^2 = c^2$ Solve for c

Travel c units along transverse axis.



The Equation of a Hyperbola?
with center (h,k)

Vertical Hyperbola
the transverse axis runs vertically

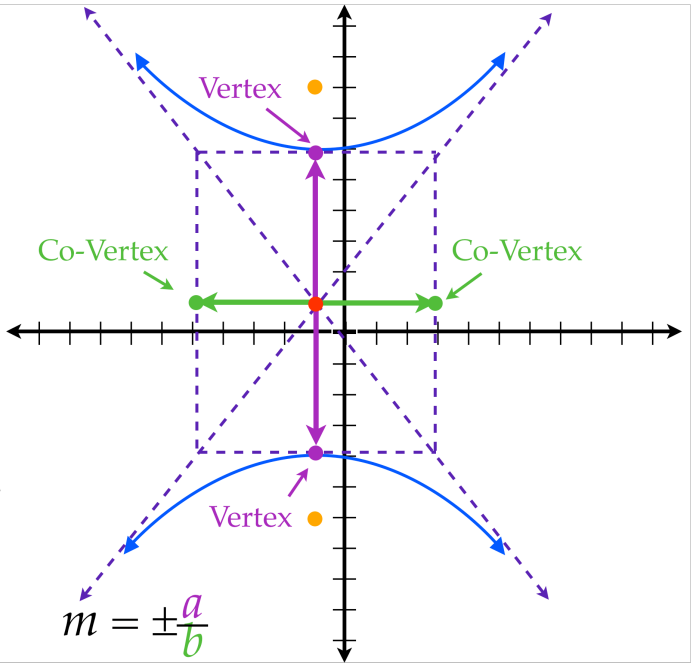
$$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$$

a is the distance you travel in the y-direction.

b is the distance you travel in the x-direction.

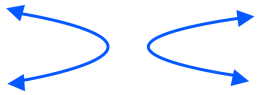
Foci: $a^2 + b^2 = c^2$ Solve for c

Travel c units along transverse axis.



What is a Hyperbola?

Horizontal Hyperbola



$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$$

Center

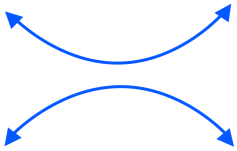
Vertices

Co-Vertices

Slope of Asymptotes

Foci

Vertical Hyperbola



$$\frac{(y-k)^2}{a^2} - \frac{(x-h)^2}{b^2} = 1$$