

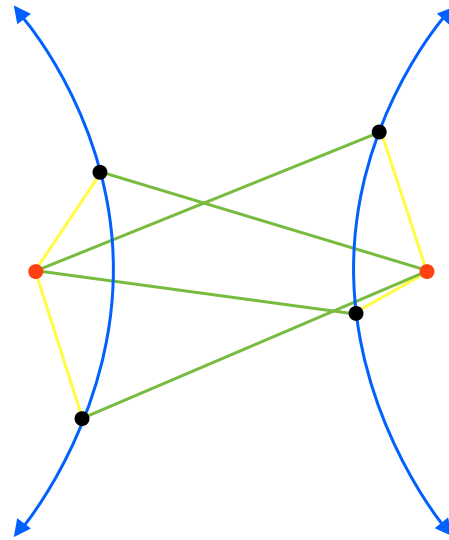
Introduction to Hyperbolas

Name _____

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.



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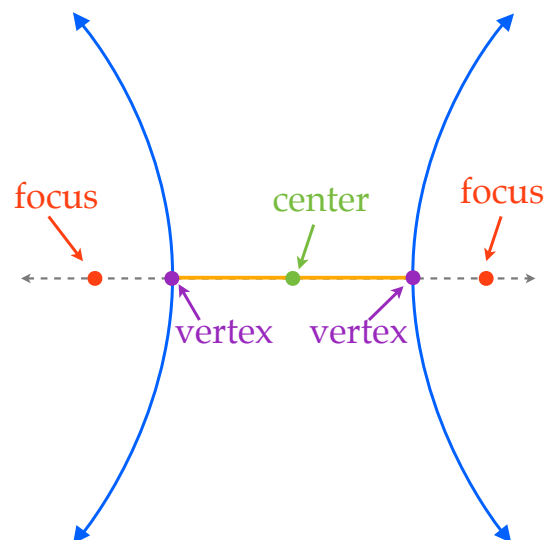
The given points are **focus points**.

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**.



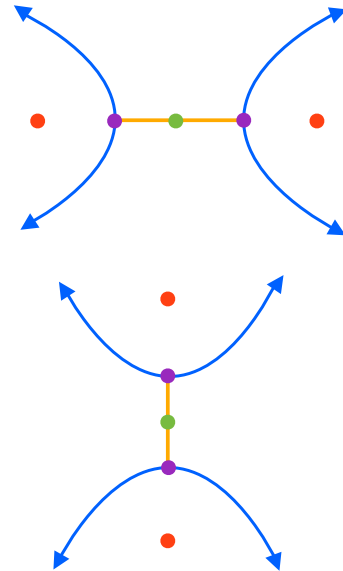
What is a **Hyperbola**?

Horizontal Hyperbola

the **transverse axis** runs horizontally

Vertical Hyperbola

the **transverse axis** runs vertically



The equation of a **hyperbola** with **center** (0,0)

Horizontal Hyperbola

the **transverse axis** runs horizontally

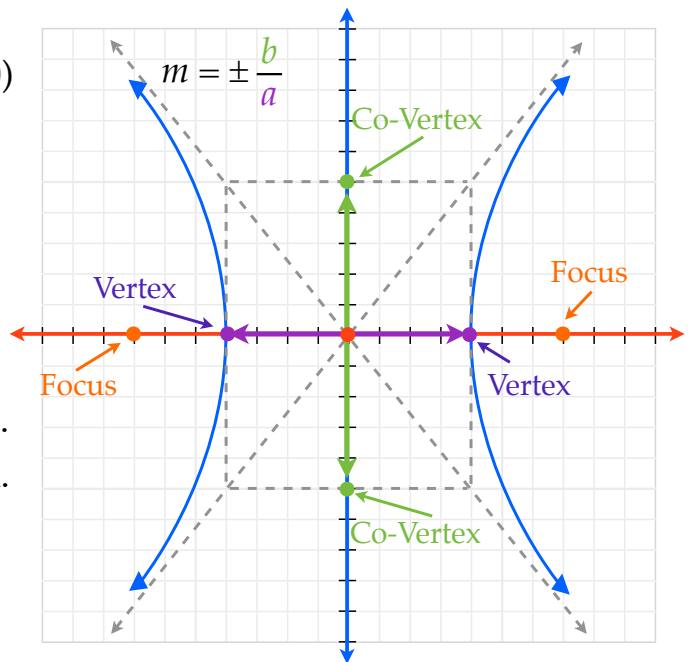
$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$$

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** (0,0)

Vertical Hyperbola

the **transverse axis** runs vertically

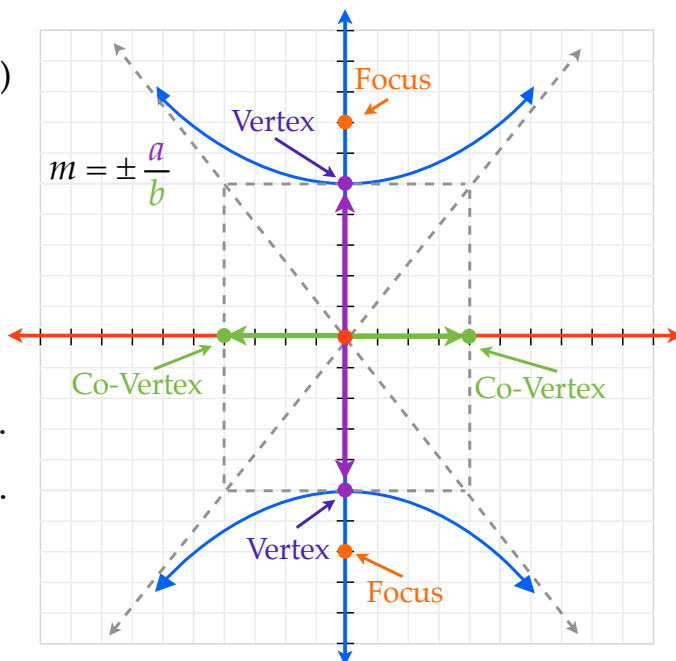
$$\frac{y^2}{a^2} - \frac{x^2}{b^2} = 1$$

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

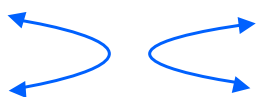
b is the distance you travel in the x -direction.

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

Travel c units along **transverse axis**.



Horizontal Hyperbola



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

Center

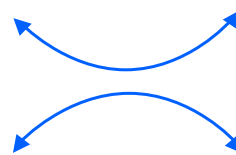
Vertices

Co-Vertices

Slope of Asymptotes

Foci

Vertical Hyperbola



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