

## What is an Ellipse?

**Ellipse** - the set of points such that the sum of the distances from **two given points** stays the same.

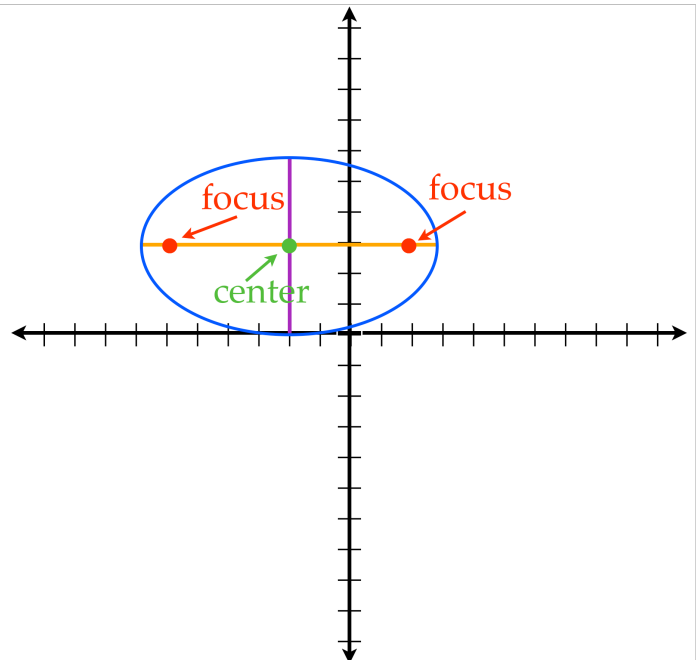
The given points are **focus points**.

The plural of **focus** is **foci**.

The midpoint of the segment joining the two **foci** is the **center** of the ellipse.

**Major Axis** - The axis of symmetry that is the longest.

**Minor Axis** - The axis of symmetry that is the shortest.



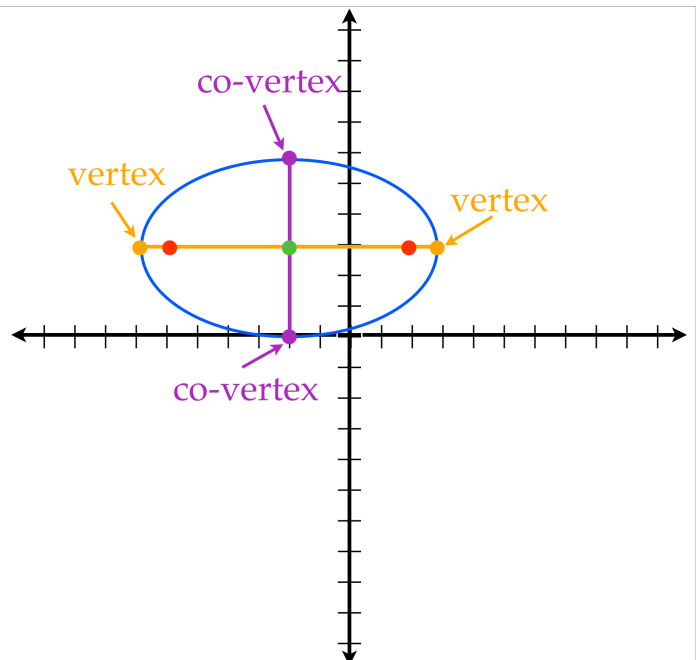
## What is an Ellipse?

**Vertices** - The endpoints of the major axis on the ellipse.

**Co-Vertices** - The endpoints of the minor axis on the ellipse.

**Major Axis** - The axis of symmetry that is the longest.

**Minor Axis** - The axis of symmetry that is the shortest.



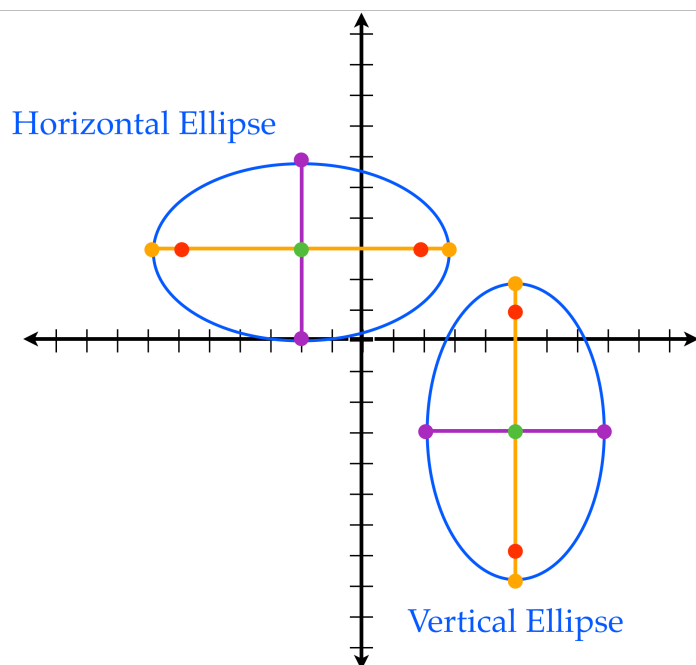
## What is an Ellipse?

### Horizontal Ellipse

if the **major axis** runs horizontally.

### Vertical Ellipse

if the **major axis** runs vertically.



## Equation of an Ellipse

with **center**  $(h,k)$

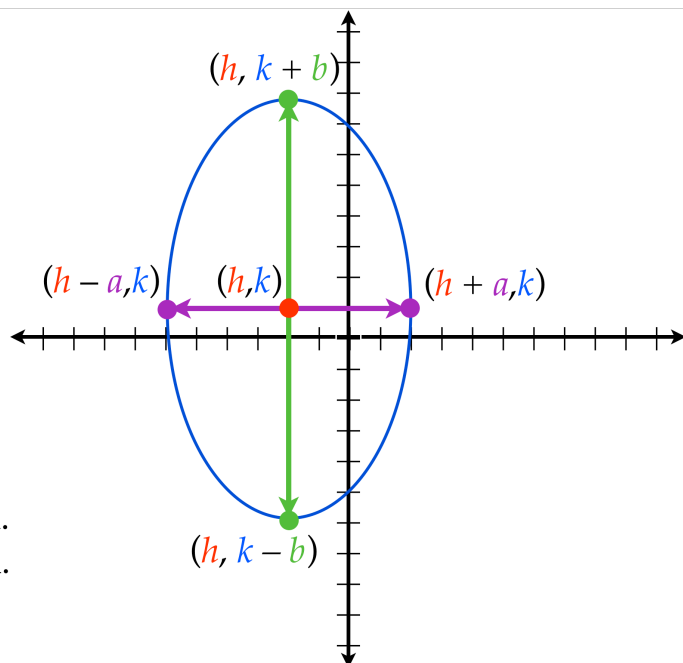
$$\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$$

**Center**  $(h,k)$

from the **center**  $(h,k)$ .

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

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

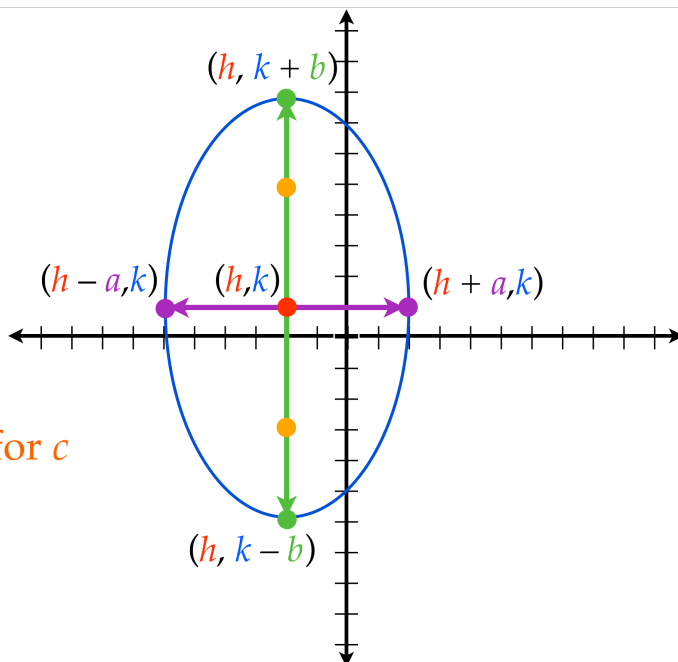


## Equation of an Ellipse with center $(h,k)$

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

Foci:  $a^2 - b^2 = c^2$  if  $a > b$       Solve for  $c$   
 $b^2 - a^2 = c^2$  if  $b > a$

Travel  $c$  units along major axis to find foci



## Equation of an Ellipse with center $(h,k)$

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

Center

Horizontal/Vertical

Major Axis Length

Minor Axis Length

Vertices

Co-Vertices

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

