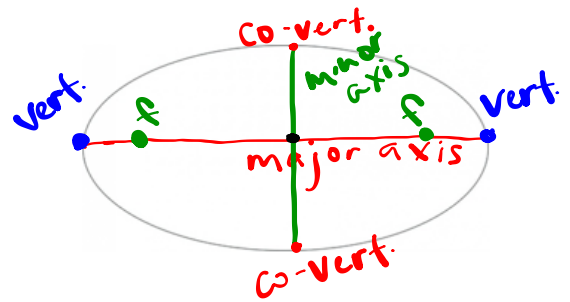
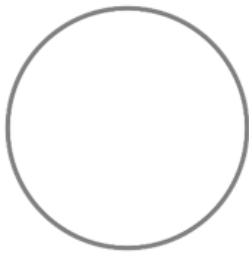


## Keeper #6: Circles and Ellipses



Standard Equation:

$$(x-h)^2 + (y-k)^2 = r^2$$

Standard Equation:

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

Main parts of a circle:

center:  $(h, k)$   
radius:  $r$

Main parts of an ellipse:

center:  $(h, k)$   
vertices:  $(h \pm a, k)$   $(h, k \pm b)$   
co-vertices:  $(h, k \pm b)$   $(h \pm a, k)$   
foci:  $c^2 = a^2 - b^2$   
eccentricity:  $\frac{c}{b}$  or  $\frac{c}{a}$

Write the standard form for the circle

Center:  $(-11, 13)$

Radius: 4

$$(x + 11)^2 + (y - 13)^2 = 16$$

Write the general form for the circle

Center:  $(2, -9)$

Radius:  $2\sqrt{17}$

$$(x - 2)^2 + (y + 9)^2 = 68$$

$$(x - 2)(x - 2) + (y + 9)(y + 9)$$

$$x^2 - 4x + 4 + y^2 + 18y + 81 = 68$$

$$x^2 + y^2 - 4x + 18y + 17 = 0$$

Write the standard form for the ellipse

Vertices:  $(0, 9), (0, -9)$

Foci:  $(0, 3\sqrt{5}), (0, -3\sqrt{5})$

$$\frac{x^2}{36} + \frac{y^2}{81} = 1$$

Vertices:  $(8, 0), (-8, 0)$

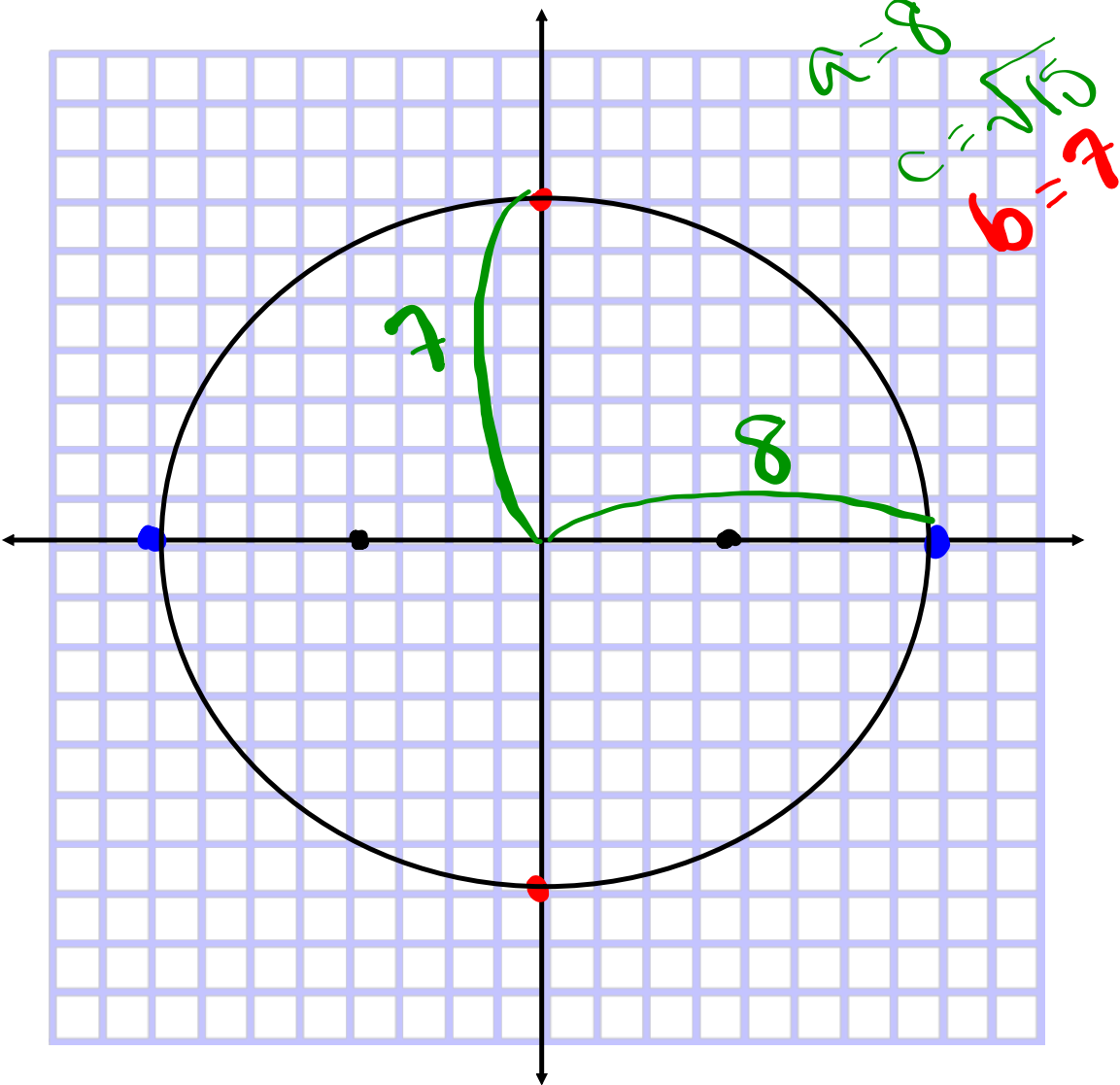
Foci:  $(\sqrt{15}, 0), (-\sqrt{15}, 0)$

$$\frac{x^2}{64} + \frac{y^2}{49} = 1$$

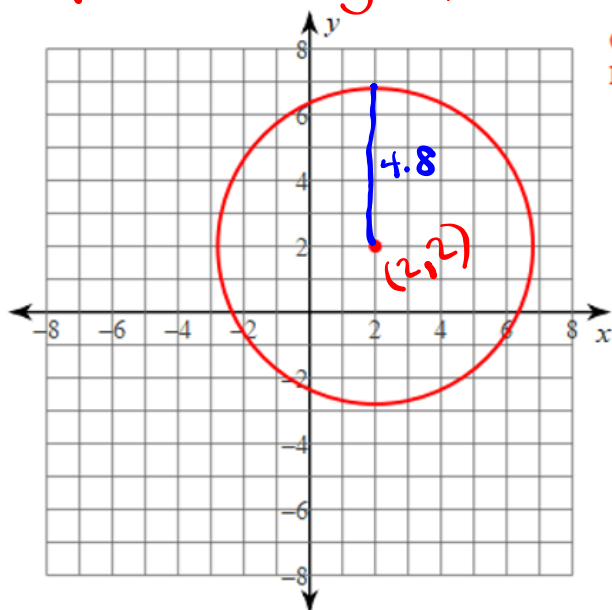
$$(\sqrt{15})^2 = 64 - 49$$

$$15 = 64 - 49$$

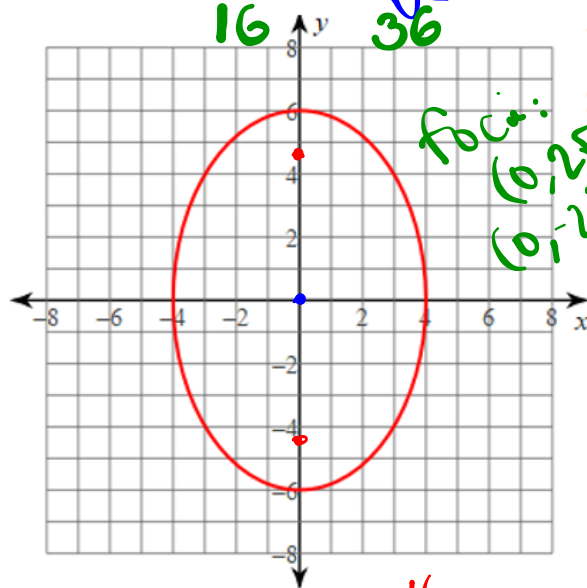
$$64 - 49 = 15$$



$$(x-2)^2 + (y-2)^2 = 4.8^2$$



$$\frac{x^2}{16} + \frac{y^2}{36} = 1$$



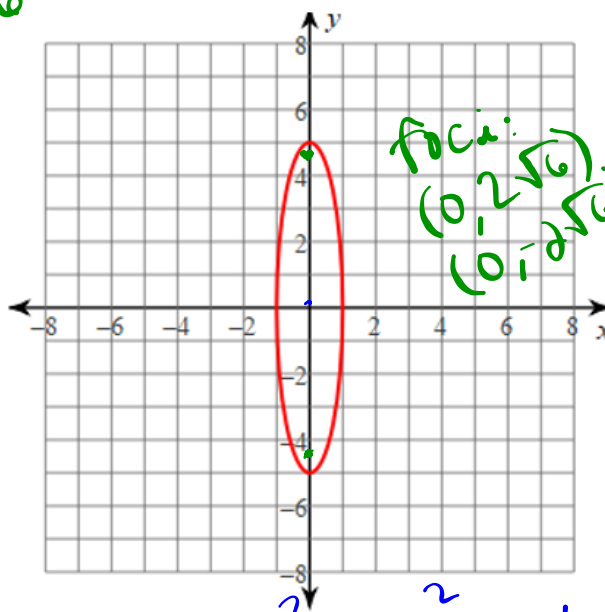
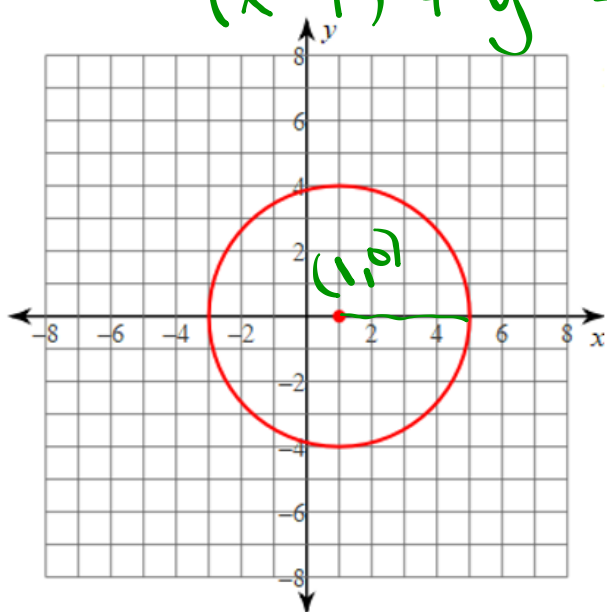
foci:  
 $(0, 2)$   
 $(0, -2)$

$$c^2 = 36 - 16$$

$$c^2 = 20$$

$$c = 2\sqrt{5}$$

$$(x - 1)^2 + y^2 = 16$$



foci:  
 $(0, 2\sqrt{6})$   
 $(0, -2\sqrt{6})$

$$\frac{1}{25}x^2 + \frac{1}{25}y^2 = 1$$

$$c^2 = 25 - 1$$

$$c^2 = 24$$

$$c = 2\sqrt{6}$$