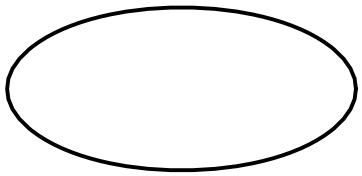
Conic Sections - Ellipses

Standard Form for the Equation of an Ellipse

Horizontal Ellipse

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



$a > b$

Center $= (h,k)$

Major Axis $= 2a$

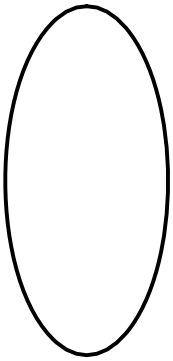
Minor Axis $= 2b$

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

Eccentricity: $e = \frac{c}{a}$

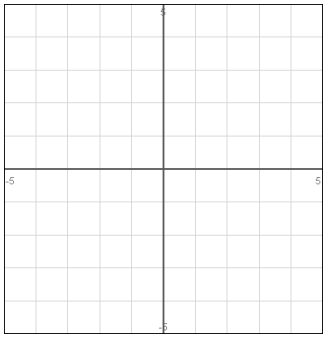
Vertical Ellipse

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

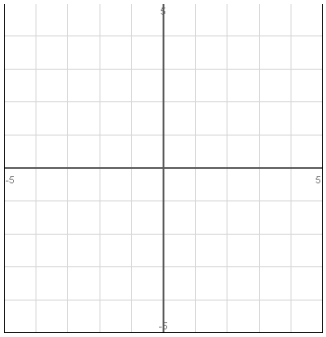


1. Find the center, vertices, foci and lengths of the major and minor axes.

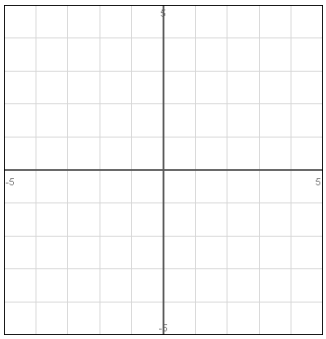
a) $x^2 + 9y^2 = 9$



b) $9x^2 + 4y^2 - 18x + 16y - 11 = 0$

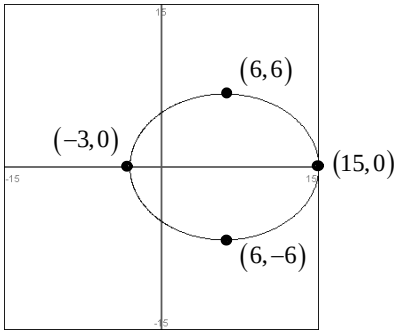


c) $12x^2 + 20y^2 - 12x + 40y - 37 = 0$

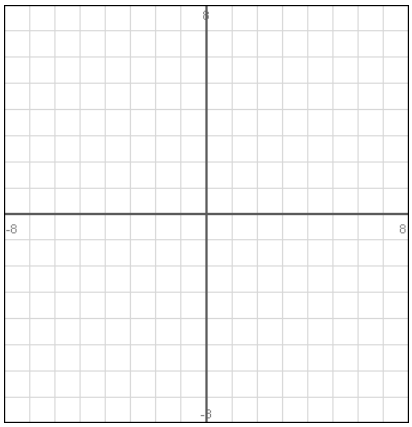


2. Find the standard form of the equation of the ellipse.

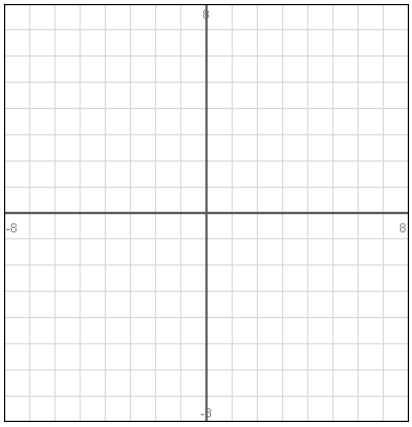
a)



b) Foci: $(0,0)$ and $(0,4)$
Length of Major Axis: 8



c) Vertices: $(-2,6)$ and $(2,6)$
Length of Minor Axis: 2



d) Vertices: $(-5,0)$ and $(5,0)$

$e = \frac{3}{5}$