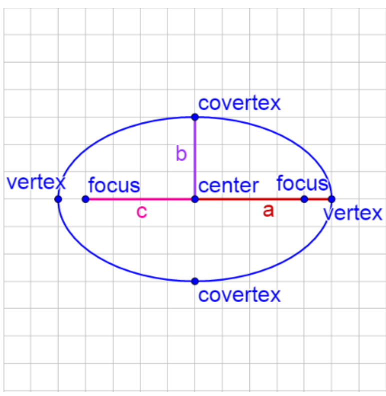
Precalculus

7-03 Ellipses and Circles

Ellipse

- Set of all points in a plane where the sum of the ________________to two fixed points, ________________, is constant.
- Major axis
  - ________________segment across the ellipse
  - Connects the two ________________.
- Minor axis
  - ________________segment across the ellipse
  - Connects the two ________________.
- Circle
  - Special form of an ellipse where both foci are at the ________________.

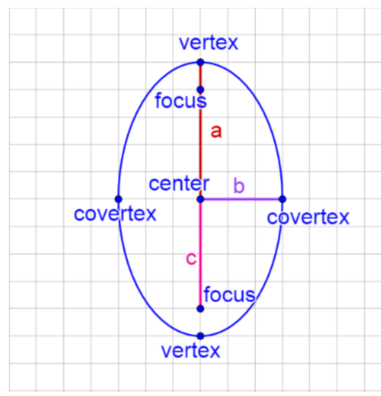
Horizontal Ellipse



- Center $(h,\ k)$
- Horizontal Major Axis length = $2a$
- Vertical Minor Axis length = $2b$
- $c^2 = a^2 - b^2$
- Vertices $(h \pm a,\ k)$
- Covertices $(h,\ k \pm b)$
- Foci $(h \pm c,\ k)$

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

Vertical Ellipse



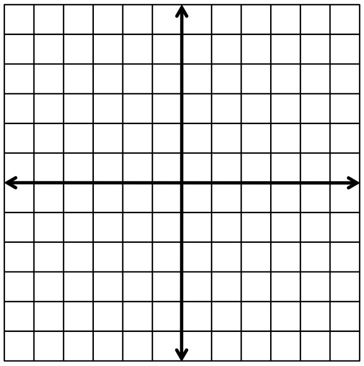
- Center $(h,\ k)$
- Vertical Major Axis length = $2a$
- Horizontal Minor Axis length = $2b$
- $c^2 = a^2 - b^2$
- Vertices $(h,\ k \pm a)$
- Covertices $(h \pm b, k)$
- Foci $(h,\ k \pm c)$

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

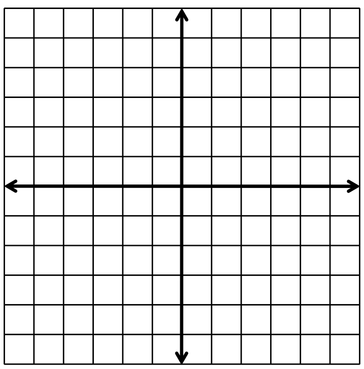
a = distance from center to ________________
b = distance from center to ________________
c = distance from center to ________________

Find the center, vertices, and foci of the ellipse $9x^2 + 4y^2 = 36$.

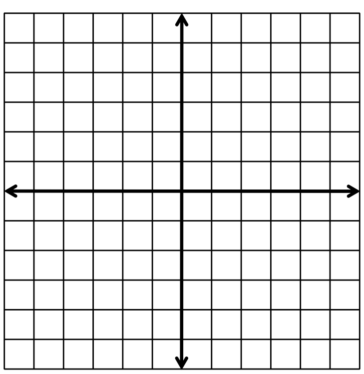
Find the standard form of the ellipse centered at (1, 2) with major axis length 10 and foci (−2, 2) and (4, 2).



Graph $\frac{(x-1)^2}{25} + \frac{(y-2)^2}{16} = 1$



Sketch the graph of $25x^2 + 9y^2 - 200x + 36y + 211 = 0$



Eccentricity

- Measure of how ________________an ellipse is
- $e = \frac{c}{a}$ where $0 < e < 1$
- If $e \approx 0$, then ellipse is almost a ________________
- If $e \approx 1$, then ellipse is almost a ________________