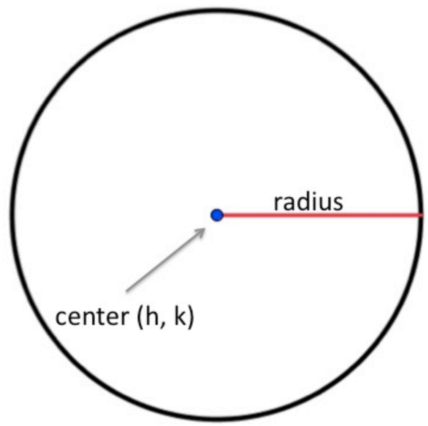
Circle

Center: (h,k)

r = radius

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



To graph: plot the center, then use the radius to get 4 points

General Form: $x^2+y^2+ax+by+c=0$

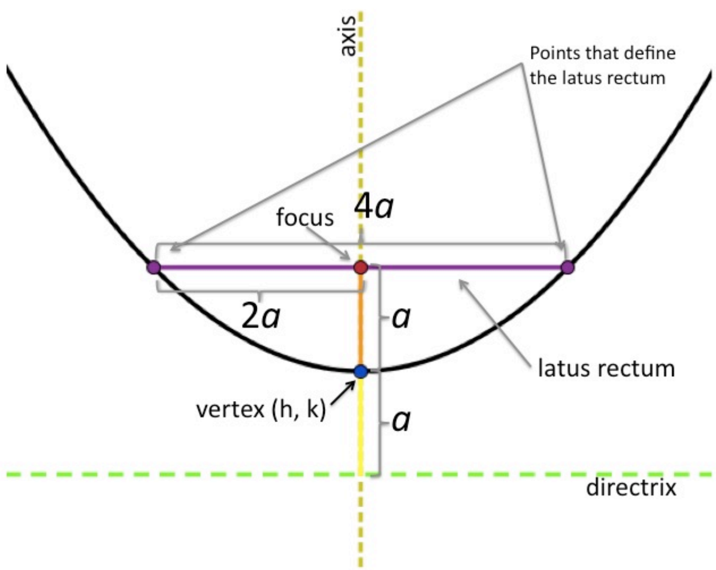
To change from general form to standard form – complete the square

Parabola

Vertex: (h, k)

a is the distance from the vertex to the focus
a is the distance from the vertex to the directrix

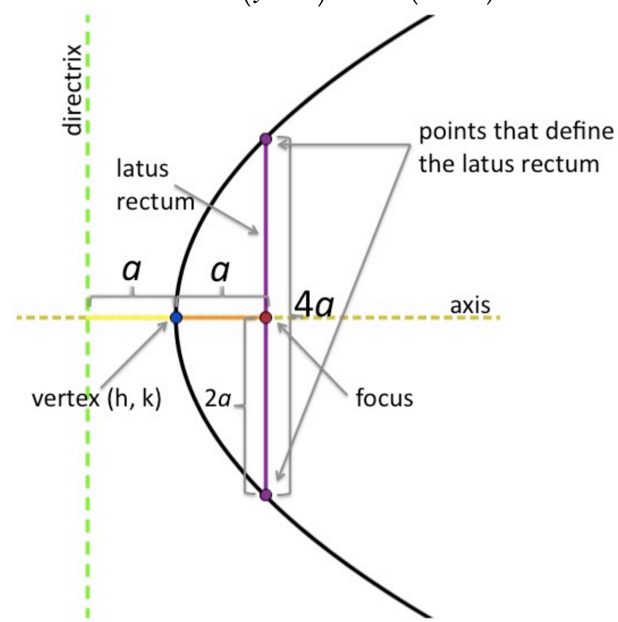
Standard Form: $(x-h)^2 = 4a(y-k)$



When "x^2" – the parabola is "regular"

- when a is positive – parabola opens up
- when a is negative – parabola opens down

Standard Form: $(y-k)^2 = 4a(x-h)$



When "y^2" – the parabola is "sideways"

- when a is positive – parabola opens to the right
- when a is negative – parabola opens to the left

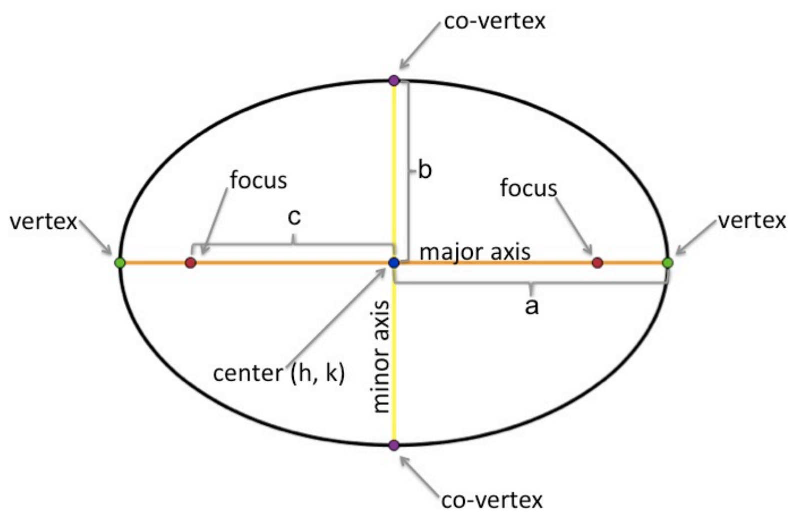
To change from general form to standard form – complete the square.

Ellipse

Center: (h, k)
$a > b > 0$
$b^2 = a^2 - c^2$

a is the distance from the center to the vertices
b is the distance from the center to the co-vertices
c is the distance from the center to the foci

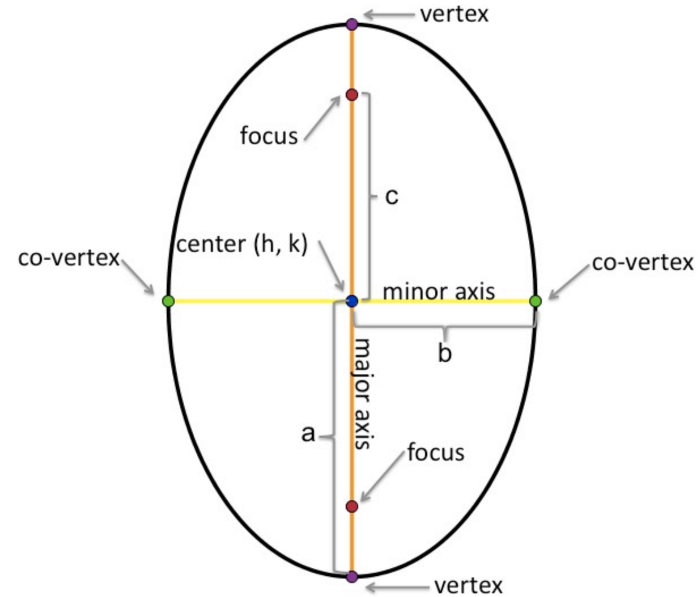
Standard Form: $\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$



Foci: $(h + c, k)$ and $(h - c, k)$
Vertices: $(h + a, k)$ and $(h - a, k)$

When the number under x^2 is larger than the number under y^2, then the major axis of the ellipse is horizontal.

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



Foci: $(h, k + c)$ and $(h, k - c)$
Vertices: $(h, k + a)$ and $(h, k - a)$

When the number under y^2 is larger than the number under x^2, then the major axis of the ellipse is vertical.

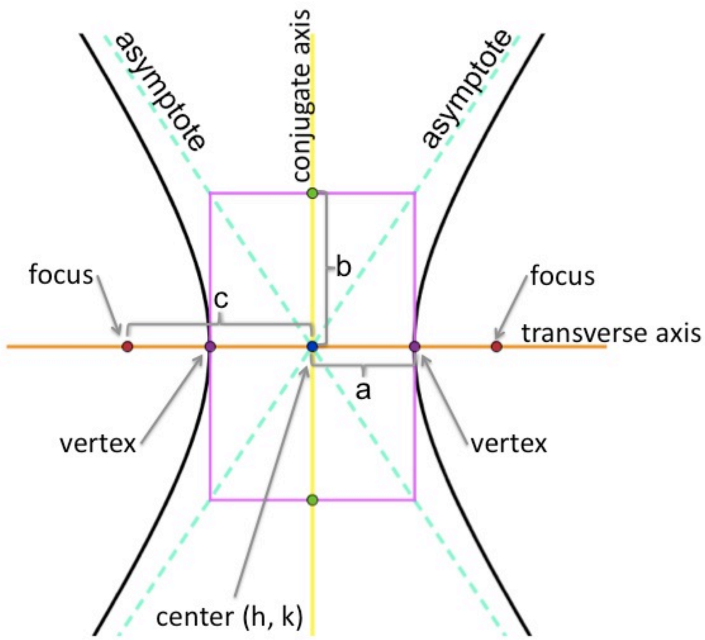
To change from general form to standard form – complete the square.

Hyperbola

Center: (h, k)
$b > a > 0$
$b^2 = c^2 - a^2$

a is the distance from the center to the vertices
b is the distance from the center to the "edge of the box"
c is the distance from the center to the foci

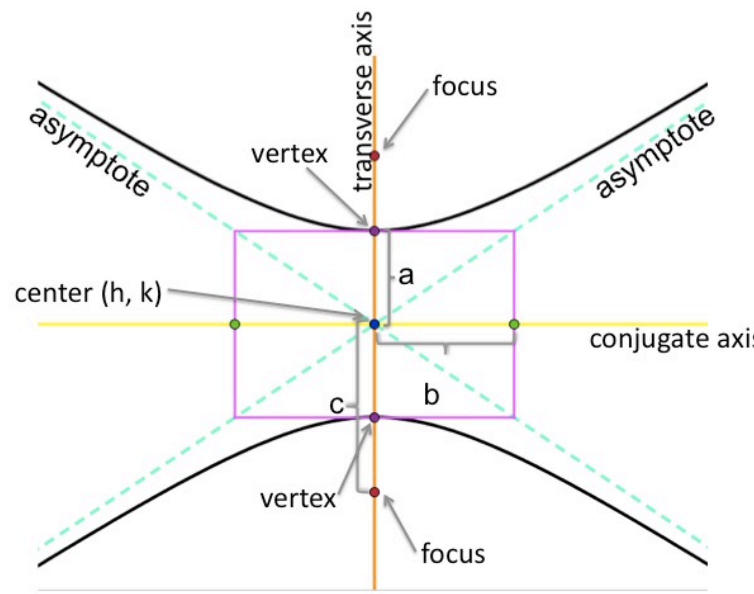
Standard Form: $\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$



Foci: $(h + c, k)$ and $(h - c, k)$
Vertices: $(h + a, k)$ and $(h - a, k)$
Asymptotes: $y - k = \pm b/a(x - h)$

When the number under y^2 is larger than the number under x^2, then the transverse axis of the hyperbola is horizontal.

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



Foci: $(h, k + c)$ and $(h, k - c)$
Vertices: $(h, k + a)$ and $(h, k - a)$
Asymptotes: $y - k = \pm a/b(x - h)$

When the number under x^2 is larger than the number under y^2, then the transverse axis of the hyperbola is vertical.

To change from general form to standard form – complete the square.