

## Circle

Standard form:  $\frac{(x-h)^2}{R^2} + \frac{(y-k)^2}{R^2} = 1$

Center:  $(h, k)$

Radius:  $R$

## Ellipse

with major axis in  $x$ ,

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

Center:  $(h, k)$

Vertices:  $(h \pm a, k)$

Covertices:  $(h, k \pm b)$

Foci:  $(h \pm c, k)$  where  $c^2 = a^2 - b^2$

with major axis in  $y$ ,

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

Center:  $(h, k)$

Vertices:  $(h, k \pm a)$

Covertices:  $(h \pm b, k)$

Foci:  $(h, k \pm c)$  where  $c^2 = a^2 - b^2$

## Hyperbola

with transverse axis in  $x$ ,

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

Center:  $(h, k)$

Vertices:  $(h \pm a, k)$

Foci:  $(h \pm c, k)$  where  $c^2 = a^2 + b^2$

Asymptotes:  $y - k = \pm \frac{b}{a}(x - h)$

with transverse axis in  $y$ ,

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

Center:  $(h, k)$

Vertices:  $(h, k \pm a)$

Foci:  $(h, k \pm c)$  where  $c^2 = a^2 + b^2$

Asymptotes:  $y - k = \pm \frac{a}{b}(x - h)$

## Parabola

opening in  $x$ ,

Standard form:  $4p(x-h) = (y-k)^2$

Vertex:  $(h, k)$

Focus:  $(h+p, k)$

Directrix:  $x = h - p$

opening in  $y$ ,

Standard form:  $4p(y-k) = (x-h)^2$

Vertex:  $(h, k)$

Focus:  $(h, k+p)$

Directrix:  $y = k - p$