

CONICS FORMULAS

CIRCLES:

The general equation of a circle is $(x - h)^2 + (y - k)^2 = r^2$ where (h, k) = the center of the circle and r = the radius of the circle.

PARABOLAS:

The general forms of a parabola are **1)** $(x - h)^2 = 4p(y - k)$ and **2)** $(y - k)^2 = 4p(x - h)$.

The vertex: (h, k) p = the focal length.

The focus of a parabola is p units from the vertex.

Axis of symmetry: $x = h$ for form 1) (set $(x - h)^2 = 0$)

Axis of symmetry: $y = k$ for form 2) (set $(y - k)^2 = 0$)

ELLIPSES:

The general forms of an ellipse are $\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$ or $\frac{(y - k)^2}{a^2} + \frac{(x - h)^2}{b^2} = 1$.

(h, k) = the center of the ellipse

2a = the length of the major axis = sum of focal radii

2b = the length of the minor axis ($a > b$ will always be true.)

Also, $b^2 = a^2 - c^2$. The foci are c units from the center on the major axis. Hence, the

general forms of an ellipse will become $\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{a^2 - c^2} = 1$ or $\frac{(y - k)^2}{a^2} + \frac{(x - h)^2}{a^2 - c^2} = 1$.

HYPERBOLAS:

The general forms of a hyperbola are $\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1$ or $\frac{(y - k)^2}{a^2} - \frac{(x - h)^2}{b^2} = 1$

(h, k) = the center of the hyperbola.

2a = the "length" of the axis of symmetry = difference of the focal radii

2b = the length of the conjugate axis

Also, $b^2 = c^2 - a^2$. The foci are c units from the center of the hyperbola on the axis of symmetry. Hence, the general forms of a hyperbola will become

$\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{c^2 - a^2} = 1$ or $\frac{(y - k)^2}{a^2} - \frac{(x - h)^2}{c^2 - a^2} = 1$.

If you are having difficulty understanding these formulas or any other formulas in mathematics, call Michael Ragusa at (703) 691-2730, send him an E-mail message at mathtutor@hmp.net, or visit his website: www.mathdepot.com You'll be glad you did!