$c = \frac{1}{4a}$

$4ac = 1$

$a = \frac{1}{4c}$

$4p = a$

Identifying Conic Sections from their Equations

$$Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$$

(Standard Form)

In this section, B = 0

Conic Section	Relationship of A and C
parabola	$A = 0$ or $C = 0$ but not both
circle	$A = C$
ellipse	A and C have the same sign and $A \neq C$
hyperbola	A and C have opposite signs

Conic Sections

Type of Conic Section	equation	vertex *or* vertices/ covertices *or* center	axis of symmetry *or* slopes of the asymptotes	focus/ foci	directrix	direction	length of major axis *or* transverse axis	length of minor axis *or* conjugate axis	length of latus rectum (L.R.) *or* radius
parabola $c = \frac{1}{4a}$	$y - k = a(x - h)^2$ $x - h = a(y - k)^2$	V(h, k)	$x = h$ $y = k$	F (h, $k+c$) F($h+c$, k)	$y = k - c$ $x = h - c$	$a>0$, up $a<0$, down $a>0$, right $a<0$, left	n/a	n/a	$\left\|\frac{1}{a}\right\|$
circle	$(x - h)^2 + (y - k)^2 = r^2$	C(h, k)	n/a	n/a	n/a	n/a	n/a	n/a	r (not r^2)
ellipse $a>b$ *a is distance between center and vertex*	$\frac{(x-h)^2}{a^2}+\frac{(y-k)^2}{b^2}=1$ $\frac{(x-h)^2}{b^2}+\frac{(y-k)^2}{a^2}=1$	C(h,k) V($h\pm a$, k) CV(h, $k\pm b$) C(h,k) V(h, $k\pm a$) CV($h\pm b$, k)	n/a	$c^2 = a^2 - b^2$ F($h\pm c$, k) $c^2 = a^2 - b^2$ F(h, $k\pm c$)	n/a	horizontal vertical	$2a$	$2b$	n/a
hyperbola *a is first* *a is distance between center and vertex*	$\frac{(x-h)^2}{a^2}-\frac{(y-k)^2}{b^2}=1$ $\frac{(y-k)^2}{a^2}-\frac{(x-h)^2}{b^2}=1$	C(h,k) V($h\pm a$, k) CV(h, $k\pm b$) C(h,k) V(h, $k\pm a$) CV($h\pm b$, k)	$m = \pm\frac{b}{a}$ $m = \pm\frac{a}{b}$	$c^2 = a^2 + b^2$ F($h\pm c$, k) $c^2 = a^2 + b^2$ F(h, $k\pm c$)	n/a	horizontal vertical	$2a$	$2b$	n/a