Conic Section	***Circle***	***Parabola***	***Ellipse***	***Hyperbola***
How to Identify (When in *standard form*: $Ax^2 + By^2 + Cx + Dy + E = 0$)	$A = B$	Either $A = 0$ or $B = 0$	$A \neq B$ …but A and B have the same sign	$A \neq B$ …and A and B have opposite signs
Special Form of Equation (You often need to *complete the square* to put the equation in this form)	$(x-h)^2 + (y-k)^2 = r^2$	$x = a(y-k)^2 + h$ (or) --- $y = a(x-h)^2 + k$ ∪ or ∩	$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$	$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$) (--- $\frac{(y-k)^2}{b^2} - \frac{(x-h)^2}{a^2} = 1$ ∪ ∩
Useful Information for Graphing	Center: (h, k) Radius: r	Vertex: (h, k) $\lvert a\rvert > 1$ → narrow $\lvert a\rvert < 1$ → wide $a > 0$: (or ∪ $a < 0$:) or ∩	Center: (h, k) Horizontal Length: $2a$ Vertical Length: $2b$ *Connect the four outside dots in an oval shape*	Center: (h, k) Horizontal Length: $2a$ Vertical Length: $2b$ Same as for ellipse *Make a box with the four outside dots (around where the ellipse would be) and draw in the diagonals*

Notes / Examples / Completing the Square / Graphing :