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Conic Sections

You can easily determine the type of conic section represented by an equation of the form $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$ when $B = 0$ by looking at A and C .

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.

Equation of a Conic Section

The equation of a conic section can be written in the form $Ax^2 + Bxy + Cy^2 + Dx + Ey + F = 0$, where A , B , and C are not all zero.

You can identify the conic section that is represented by a given equation by writing the equation in one of the standard forms you have learned.

Conic Section	Standard Form of Equation
parabola	$y = a(x - h)^2 + k$ or $x = a(y - k)^2 + h$
circle	$(x - h)^2 + (y - k)^2 = r^2$
ellipse	$\frac{(x - h)^2}{a^2} + \frac{(y - k)^2}{b^2} = 1$ or $\frac{(x - h)^2}{b^2} + \frac{(y - k)^2}{a^2} = 1$ $a \neq b$
hyperbola	$\frac{(x - h)^2}{a^2} - \frac{(y - k)^2}{b^2} = 1$ or $\frac{(y - k)^2}{a^2} - \frac{(x - h)^2}{b^2} = 1$ or $xy = c$, when $c \neq 0$