

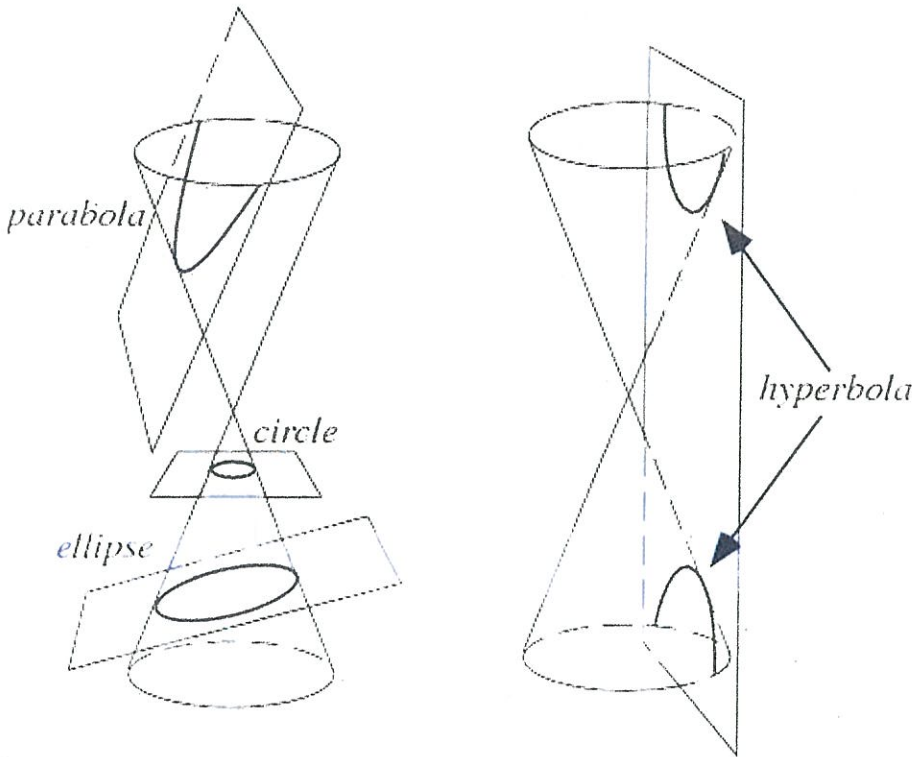
Conic Sections...Circles

Focus: What does the standard form of a circle look like?

$$C: (0,0) \quad r = \text{radius} \quad x^2 + y^2 = r^2$$

~~Conics~~ Def of a circle: set of all points that are equidistant from the center.

Conic Sections:



General Form: Conic Section

$$Ax^2 + By^2 + Cx + Dy + E = 0$$

Parabola: $A=0$, or $B=0$
only have x^2 or y^2

Ellipse: $A \neq B$, same sign
 $4x^2 + 16y^2 \dots$

Circle: $A = B$, same sign
 $Ax^2 + By^2 \dots \quad 4x^2 + 4y^2 \dots$

Hyperbola: $A + B$ diff. signs
 $x^2 - 25y^2 \dots$

Completing the square:

$$1) x^2 + 10x + \underline{25} = (x + 5)^2$$

$$2) x^2 + \frac{5}{2}x + \underline{\frac{25}{16}} = \left(x + \frac{5}{4}\right)^2$$

$$3) 4x^2 + 16x + \underline{\quad} = 4(x^2 + 4x + \underline{4}) = 4(x + 2)^2$$

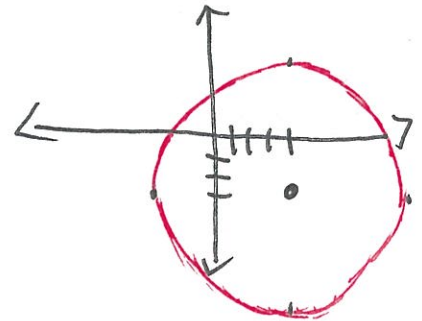
Standard form of a circle:

$$(x - h)^2 + (y - k)^2 = r^2$$

$C: (h, k)$
 $r = \text{radius}$

$$4) (x - 4)^2 + (y + 3)^2 = 49$$

$C: (4, -3) \quad r = 7$



$$5) 4x^2 + 16x + 4y^2 + 48y = 13$$

$$4(x^2 + 4x + \underline{4}) + 4(y^2 + 12y + \underline{36}) = 13 + 16 + 144$$

$$4(x + 2)^2 + 4(y + 6)^2 = 173$$

$$(x + 2)^2 + (y + 6)^2 = \frac{173}{4}$$

Formulas to remember:

$$\begin{cases} d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ M = \left(\frac{x_2 + x_1}{2}, \frac{y_2 + y_1}{2}\right) \end{cases}$$

$C: (-2, -6)$
 $r: \frac{\sqrt{173}}{2}$