Conic Sections: Day 1
Circles

Equations of a Circle

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

$r = $ radius

(h,k) center

from Pyth. Thry / Distance Formula

Parametric Form

$$X = r\cos T + h$$
$$Y = r\sin T + k$$

1. Find the center and radius of the circle: $(x+2)^2 + (y-3)^2 = 18$

$(-2, 3)$ $r = \sqrt{18} = 3\sqrt{2}$

2. Write the equation of a circle with center (6, -8) and radius = 1.

$$(X-6)^2 + (y+8)^2 = 1$$

Completing the Square to Write a Circle in General Circle Form

* square half of the middle term

* add to both sides to keep equation balanced

* factors as a perfect square!

① $x^2 + 8x + y^2 - 6y = 0$ [CIRCLE]

$x^2 + 8x + \underline{16} + y^2 - 6y + \underline{9} = 0 + \underline{16} + \underline{9}$

$(x+4)^2 + (y-3)^2 = 25$

center $(-4, 3)$ $r = 5$

② $x^2 + y^2 = 4x - 10y + 7$ [CIRCLE]

$x^2 - 4x + \underline{4} + y^2 + 10y + \underline{25} = 7 + \underline{4} + \underline{25}$

$(X-2)^2 + (y+5)^2 = 36$

center: $(2, -5)$ $r = 6$