Geometric Definition
A circle is the set of all points in a plane that are at a constant distance
from a fixed point in that plane. The fixed point is the center of the circle,
and the constant distance is the radius of the circle.

A Circle in Standard Form
The equation of a circle in standard form is:
$(x - h)^2 + (y - k)^2 = r^2$
where the center of the circle is represented by the point (h, k)
and the radius is represented by r.

Ex 1) Find an equation of the circle with center (-3, 2) and radius 3.
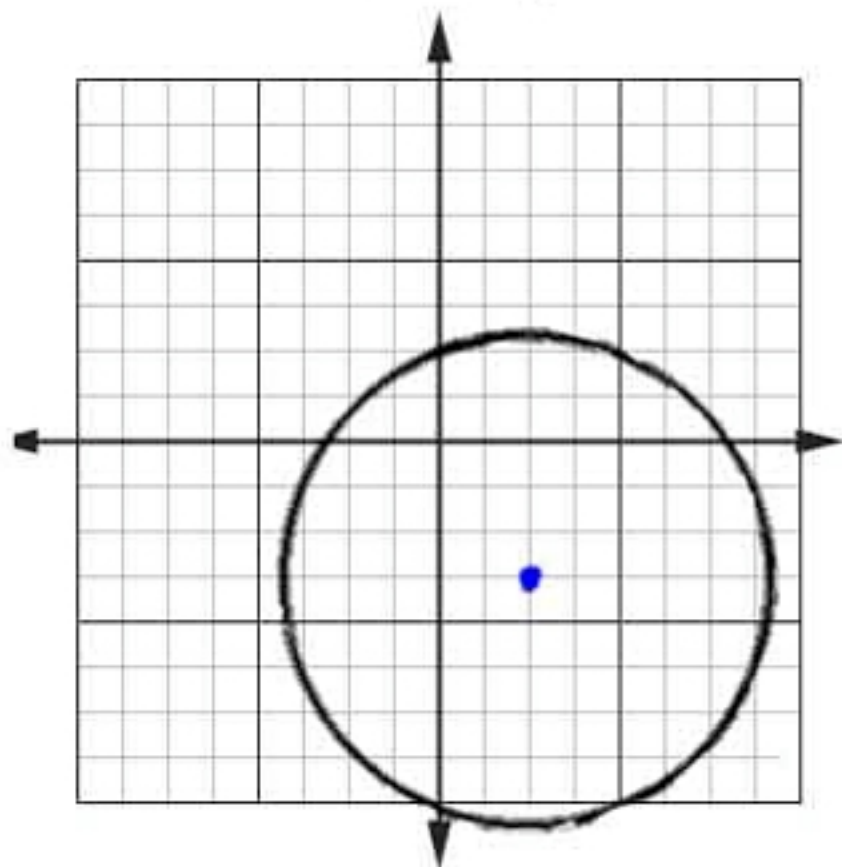
$$h = -3, \quad k = 2 \qquad r = 3$$

$$(x + {}^+3)^2 + (y - 2)^2 = 3^2$$

$$(x + 3)^2 + (y - 2)^2 = 9$$

Ex 2) Find the center and radius of $(x - 2)^2 + (y + 3)^2 = 16$.
 Then graph the circle.

Center $(2, -3)$ radius $= 4$

Circles in General Form:
$Ax^2 + By^2 + Cx + Dy + E = 0$
For Circles $A = B$
A & B have to be the same number and same sign.

Ex 3) Find the center and radius of the circle, then graph
$x^2 + y^2 + 8x - 2y + 15 = 0$

$$x^2 + 8x \qquad + y^2 - 2y \qquad = -15$$

$$(x^2 + 8x + 16) + (y^2 - 2y + 1) = \begin{matrix} -15 \\ +16 \\ +1 \end{matrix}$$

$$(x+4)^2 + (y-1)^2 = 2$$

center $(-4, 1)$ radius $= \sqrt{2}$

$$\doteq 1.4$$