

The standard form of a circle:  $(x-h)^2 + (y-k)^2 = r^2$

Center:  $(h, k)$

Radius:  $r$

1. Write the equation of a circle with  $C(-6, 10)$ ,  $r=3$

$$(x+6)^2 + (y-10)^2 = 9$$

### Example 2

Find the center and radius of  $x^2 + y^2 - 6x + 4y + 9 = 0$

Complete the Square in  $x$  and  $y$

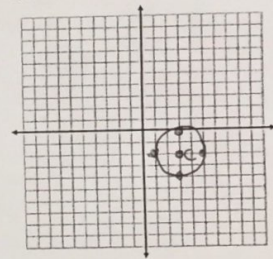
$$(x^2 - 6x + 9) + (y^2 + 4y + 4) = -9 + 9 + 4$$

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

Sketch a graph.

$$C(3, -2)$$

$$r = 2$$



### Example 3

Find the standard equation of the circle whose diameter contains the points  $(3, 5)$  and  $(6, 1)$ . -Endpoints

midpt formula Center  $(\frac{9}{2}, 3)$

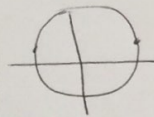
$$(x - \frac{9}{2})^2 + (y - 3)^2 = r^2$$

$$(3 - \frac{9}{2})^2 + (5 - 3)^2 = r^2$$

$$(-\frac{3}{2})^2 + 2^2 = r^2$$

$$\frac{9}{4} + 4 = r^2$$

$$r^2 = \frac{25}{4}$$



$r =$

$$(x - \frac{9}{2})^2 + (y - 3)^2 = \frac{25}{4}$$

$$C(\frac{9}{2}, 3)$$

$$r = \frac{5}{2}$$

\* A circle has two squared variables with positive same coefficients!