

# What You Will Learn

- Write and graph equations of circles.

$$y = mx + b \quad \text{slope intercept form}$$

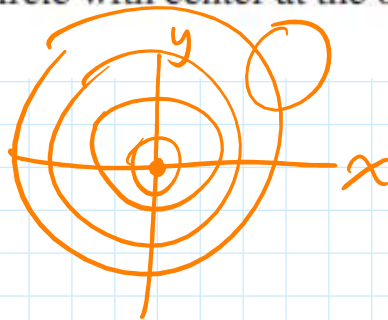
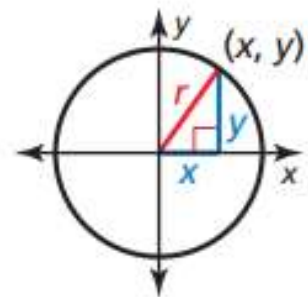
$$(y - y_1) = m(x - x_1) \quad \text{point slope form}$$

## Writing and Graphing Equations of Circles

Let  $(x, y)$  represent any point on a circle with center at the origin and radius  $r$ . By the Pythagorean Theorem (Theorem 9.1),

$$x^2 + y^2 = r^2$$

This is the equation of a circle with center at the origin and radius  $r$ .

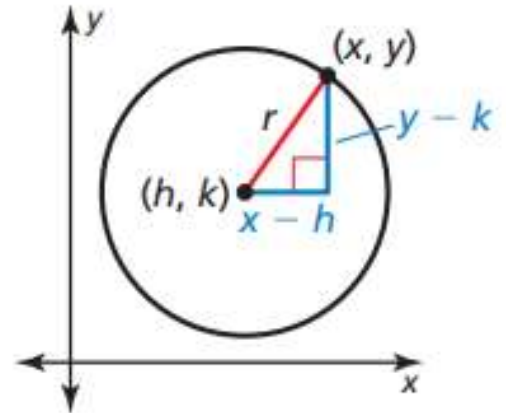


## Standard Equation of a Circle

Let  $(x, y)$  represent any point on a circle with center  $(h, k)$  and radius  $r$ . By the Pythagorean Theorem (Theorem 9.1),

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

This is the **standard equation of a circle** with center  $(h, k)$  and radius  $r$ .

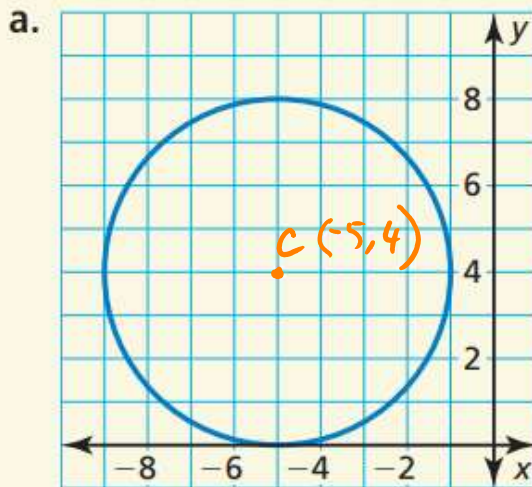


$$y = mx + b$$

↓

$$y = 3x - 2$$

Write the standard equation of each circle.



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

$(h, k)$  = center of circle

$$(x - (-5))^2 + (y - 4)^2 = 4^2$$

$$(x + 5)^2 + (y - 4)^2 = 4^2$$

$$(x + 5)^2 + (y - 4)^2 = 16$$

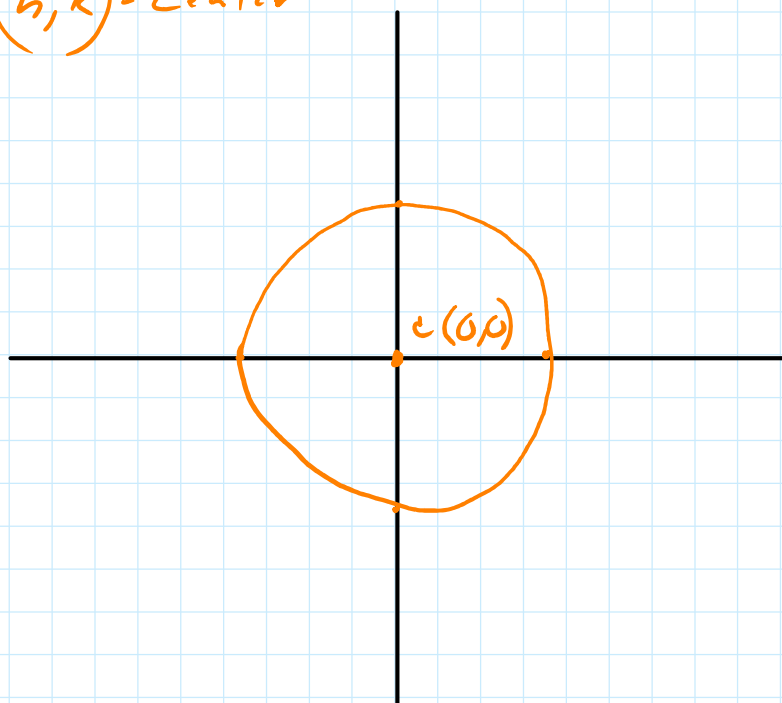
Write the standard equation of the circle with center at the origin and radius 3.5.

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

$(h, k) = \text{center}$

$$(x-0)^2 + (y-0)^2 = 3.5^2$$

$$x^2 + y^2 = 3.5^2$$



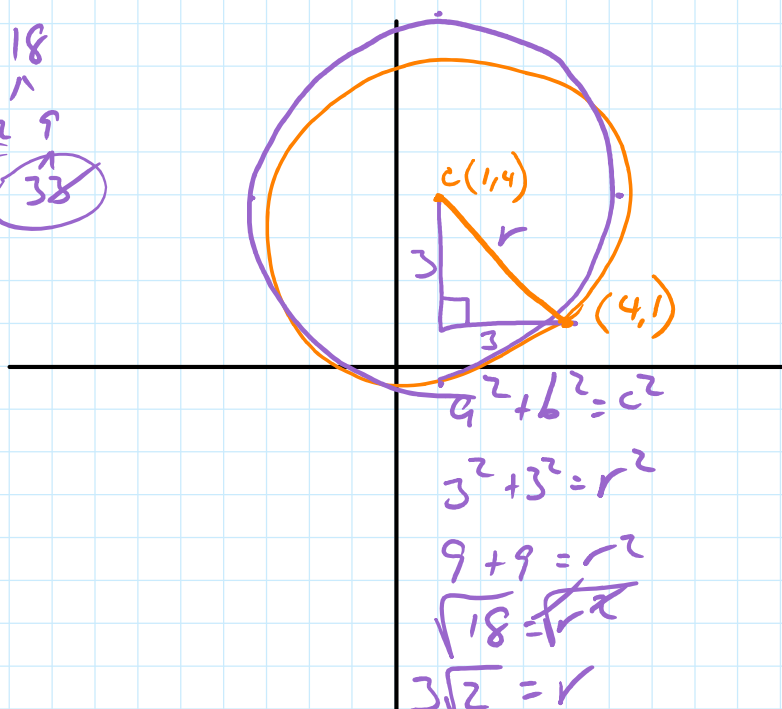
The point (4,1) is on a circle with center (1,4). Write the standard equation of the circle.

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

$$(x-1)^2 + (y-4)^2 = (3\sqrt{2})^2$$

$$(x-1)^2 + (y-4)^2 = 18$$

$$\begin{array}{c} 18 \\ \wedge \\ \frac{18}{3^2} = 9 \\ \frac{18}{3^2} = 9 \\ \frac{18}{3^2} = 9 \end{array}$$



$$\sqrt{18} = 3\sqrt{2}$$

The point (3,4) is on a circle with center (1,4). Write the standard equation of the circle.

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

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

with

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

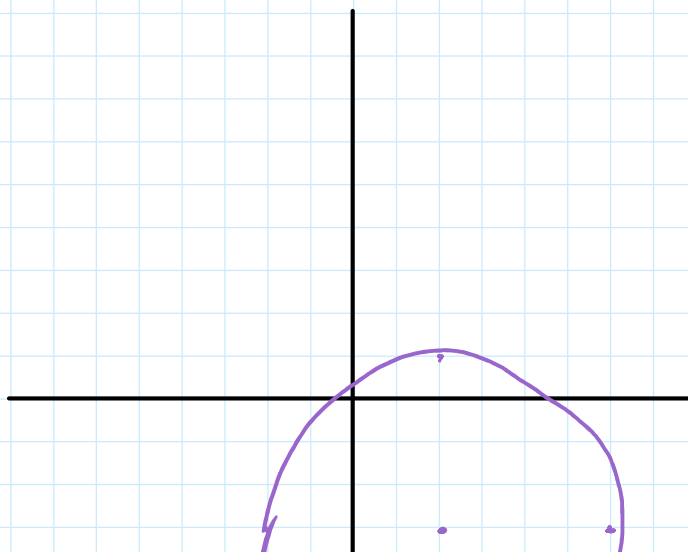
c(1,4) • (3,4)

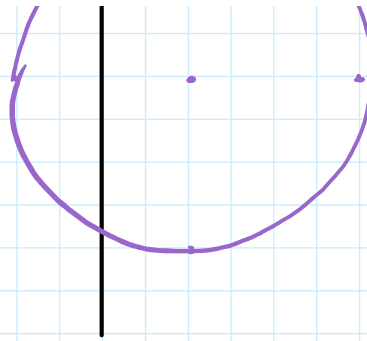
Graph the circle which has an equation

$$(x-2)^2 + (y+3)^2 = 16$$

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

(2, -3) radius = 4





Graph the circle with equation

$$(x + 2)^2 + (y - 1)^2 = 25$$

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

$(-2, 1)$  - center

$$\sqrt{r^2} = \sqrt{25}$$

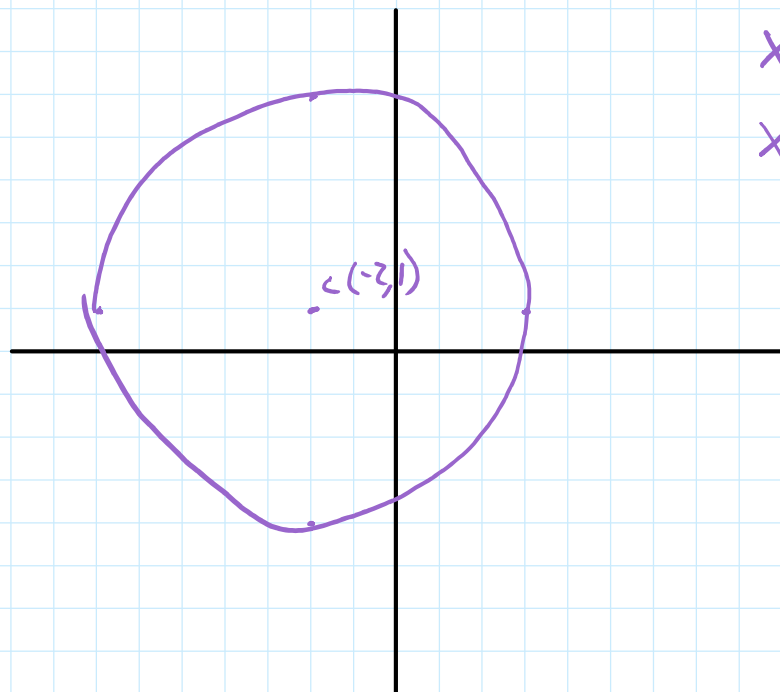
$$r = 5$$

$$x + 2 \rightarrow x -$$

$$5 = x$$

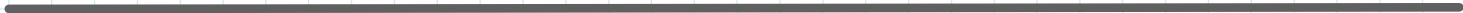
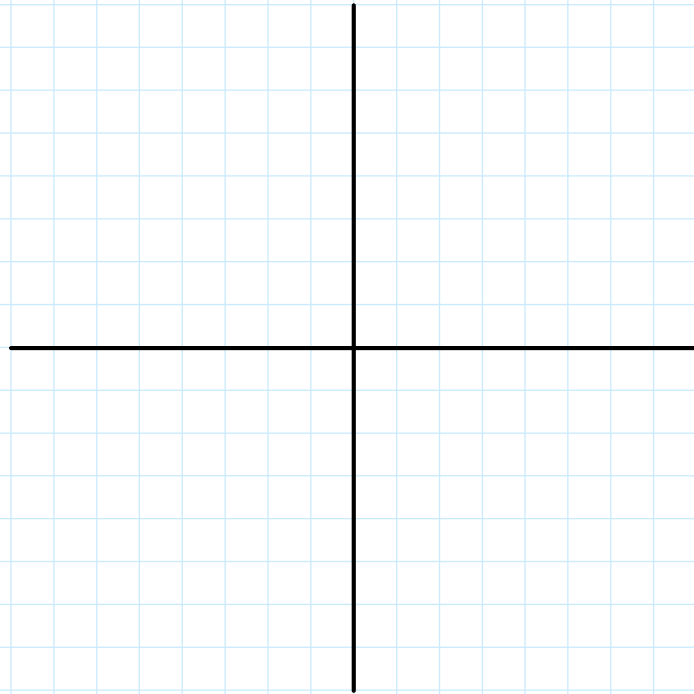
$$x + 2 = 7$$

$$x - 2 = 7$$



Graph the circle with equation

$$(x + 1)^2 + y^2 = 9$$



Practice sec 10.7 pg.  
579: 1-13A

