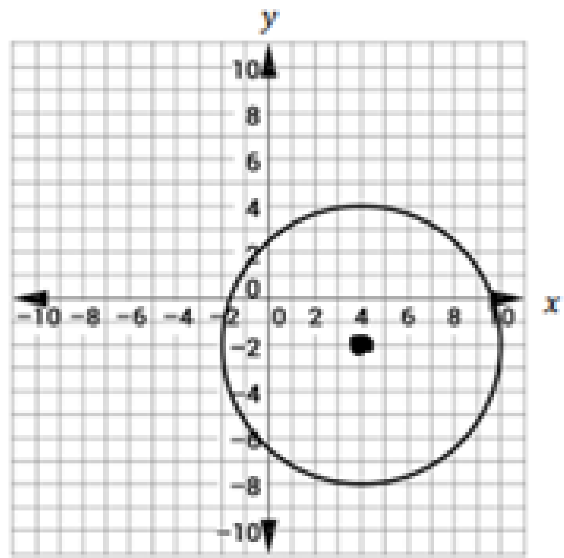
$$(x-h)^2+(y-k)^2=r^2$$
$$(x-4)^2+(y--2)^2=6^2$$
$$(x-4)^2+(y+2)^2=36$$

Write the equation of the graphed circle.

$(4,-2)$

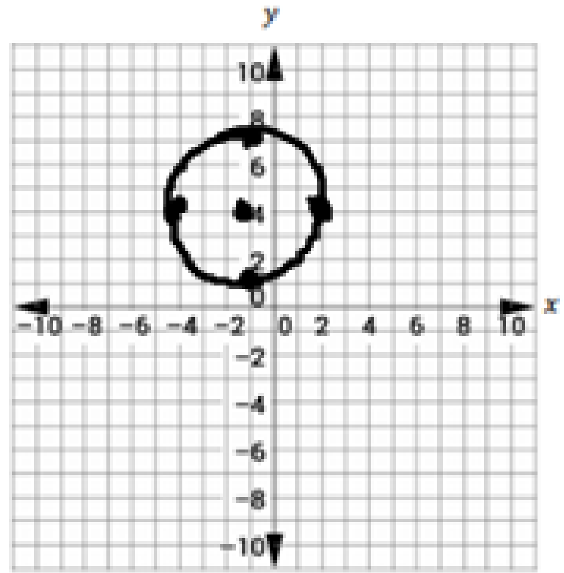
$r=6$



$(-1, 4)$ $r=3$

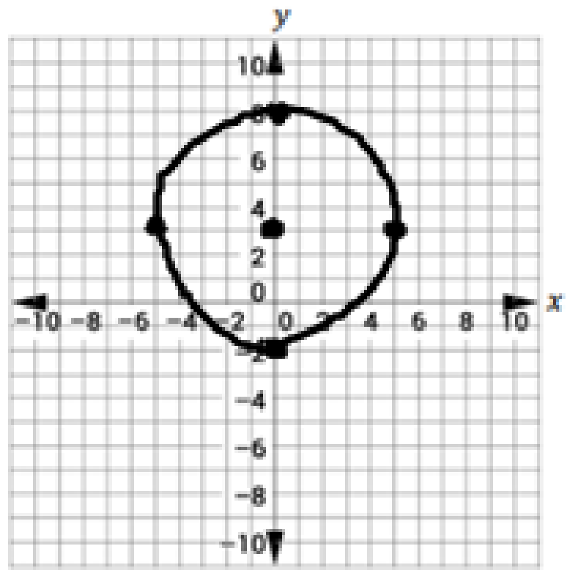
4. Graph each equation.

a. $(x+1)^2 + (y-4)^2 = 9$



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

(0,3)
r=5

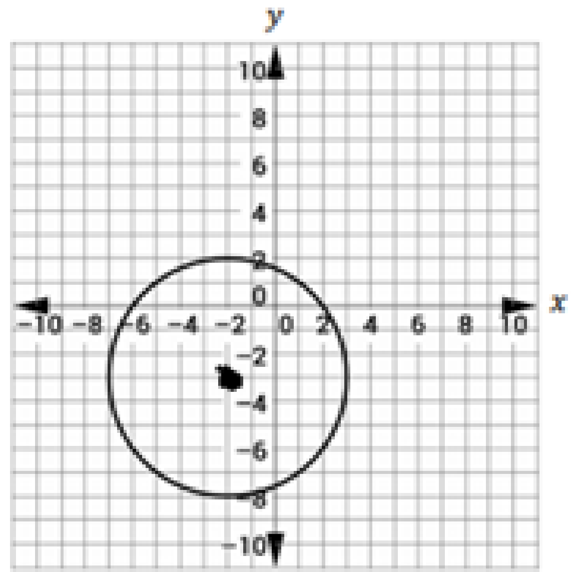


$(x+2)^2+(y+3)^2=25$

Write the equation of the graphed circle.

$(-2,-3)$

$r=5$



Informal Assessment:

Let $(5, -7)$ be the center of the circle and (x, y) be any point on the circle. Then, the horizontal distance from (x, y) to the center is

- ● $|x - 5|$.
- ○ $|x + 5|$.
- ○ $|x - 7|$.
- ○ $|x + 7|$.

radius = 4

The vertical distance from (x, y) to the center is

- ○ $|y - 5|$.
- ○ $|y + 5|$.
- ○ $|y - 7|$.
- ● $|y + 7|$.

The distance from (x, y) to the center is

- ○ 2.
- ● 4.
- ○ 12.
- ○ 16.

Finally, the

- ○ perimeter formula
- ● Pythagorean Theorem
- ○ quadratic formula
- ○ slope formula

can now be used to create an equation that shows the relationship between the horizontal distance, vertical distance, and distance of (x, y) to the center of the circle.

Consider the equation written in general form.

$x^2 + y^2 - 10y = 119$. How can we use completing the square to show that the equation resembles a circle?

$$x^2 + y^2 - 10y = 119$$

$$x^2 + y^2 - 10y + \left(\frac{-10}{2}\right)^2 = 119 + \left(\frac{-10}{2}\right)^2$$

$$x^2 + y^2 - 10y + 25 = 119 + 25$$

$$x^2 + (y-5)^2 = 144$$

Complete the square to transform the equation to standard form.
What is the center and the radius of the circle? Graph it.

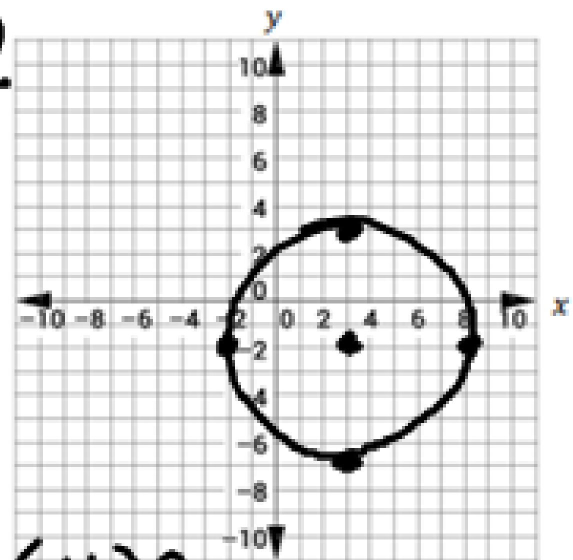
$$x^2 + y^2 - 6x + 4y - 12 = 0$$

$$x^2 - 6x + y^2 + 4y = 12$$

$$x^2 - 6x + \left(\frac{-6}{2}\right)^2 +$$

$$y^2 + 4y + \left(\frac{4}{2}\right)^2 =$$

$$12 + \left(\frac{-6}{2}\right)^2 + \left(\frac{4}{2}\right)^2$$



$(3, -2)$

$r = 5$

$$x^2 - 6x + 9 + y^2 + 4y + 4 = 12 + 9 + 4$$

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

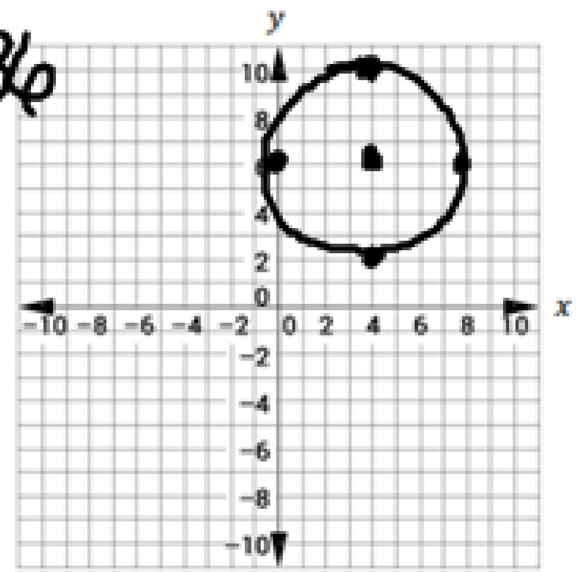
$x^2 + y^2 - 8x - 12y = -36$

$x^2 - 8x + y^2 - 12y = -36$

$x^2 - 8x + \left(\frac{-8}{2}\right)^2 +$

$y^2 - 12y + \left(\frac{-12}{2}\right)^2 =$

$-36 + 16 + 36$



$x^2 - 8x + 16 + y^2 - 12y + 36 = 16$

$(x-4)^2 + (y-6)^2 = 16$

$(4, 6) \quad r = 4$

$$x^2 + y^2 - 10x - 12y + 45 = 0$$

$$x^2 - 10x + y^2 - 12y = -45$$

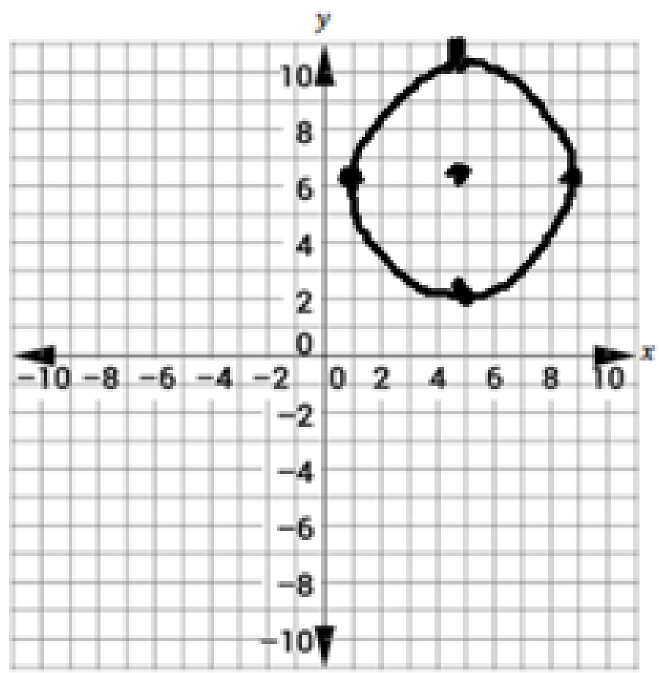
$$x^2 - 10x + \left(\frac{-10}{2}\right)^2 + y^2 - 12y + \left(\frac{12}{2}\right)^2 = -45 + 25 + 36$$

$$x^2 - 10 + 25 + y^2 - 12y + 36 = 16$$

$$(x-5)^2 + (y-6)^2$$

$(5, 6)$

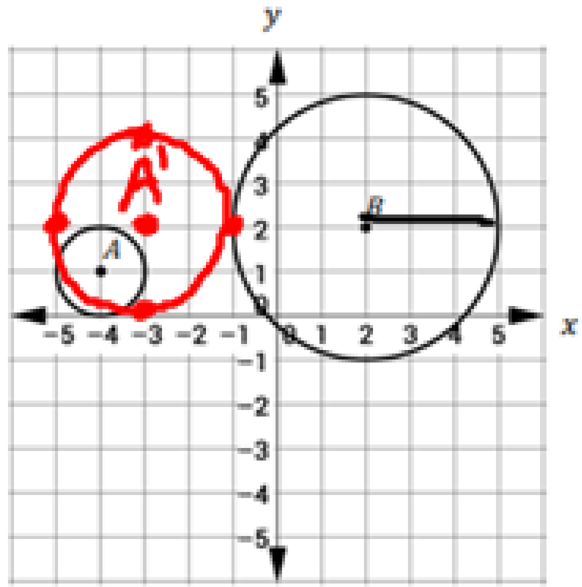
$r = 4$



Transformations of Circles:

What transformation(s) will map circle A onto circle B?

(-3, 2)



$(x, y) \to (x+6, y+1)$

$k\,r$

$1(3) \Rightarrow k = 3$

Graph the result of a transformation of circle A using the rule (x, y) → (x + 1, y + 1) followed by a dilation of scale factor two centered at pointA'

$(2x, 2y)$

$2(-3), 2(2)$

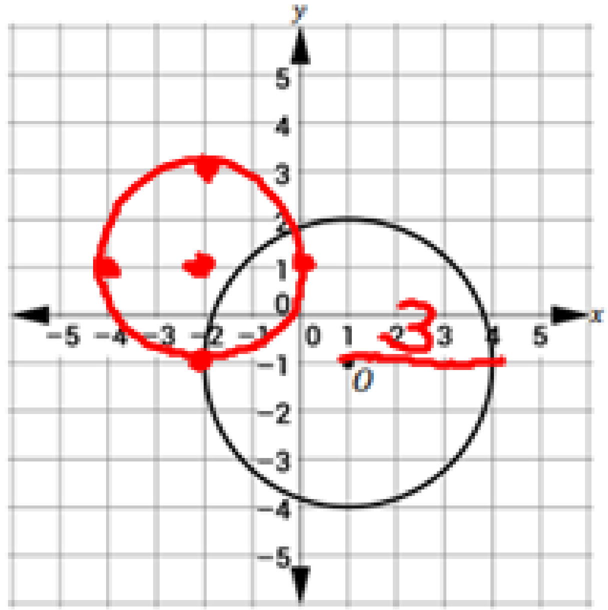
$A''(-6, 4)$

Describe where A" will be located if circle A' is dilated by scale factor two centered at the origin instead of centered at point A'.

Your turn:

Graph the result of a transformation using the rule $(x, y) \rightarrow (x - 3, y + 2)$ followed by a dilation of scale factor $\frac{2}{3}$ centered on point O' on the coordinate plane below.

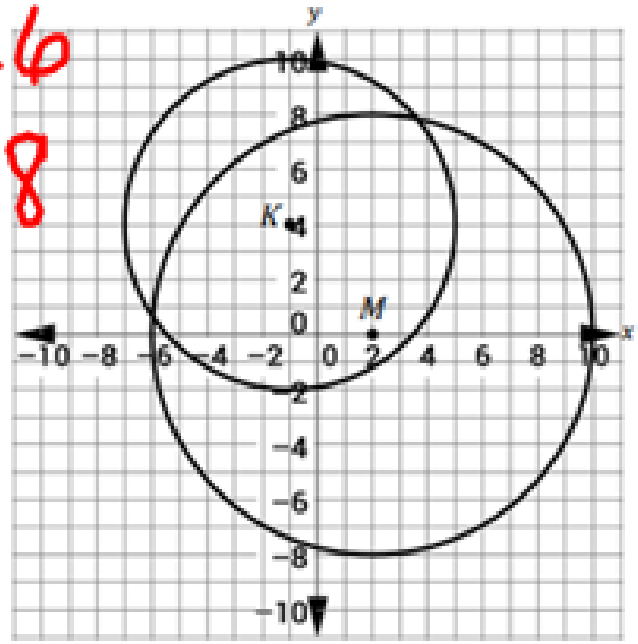
$\cancel{3}\left(\frac{2}{\cancel{3}}\right)$



Consider the following diagram.

$\odot K \; r=6$

$\odot M \; r=8$



Describe the sequence of transformations that carry circle *K* onto circle *M*.

$k = \frac{8}{6}$ & $(x,y) \rightarrow (x+3, y-4)$

$= \frac{4}{3}$ centered at K