

Section 6-3

A Soliloquy about Circles

Name: _____

What is a circle? It is geometrically defined by a set of points or locus of points that are equidistant from a point (the **center**). Consider the circle at the right. What is the length of every segment drawn from center O to a point on the edge of the circle?

They appear to all have a length of 5 units.

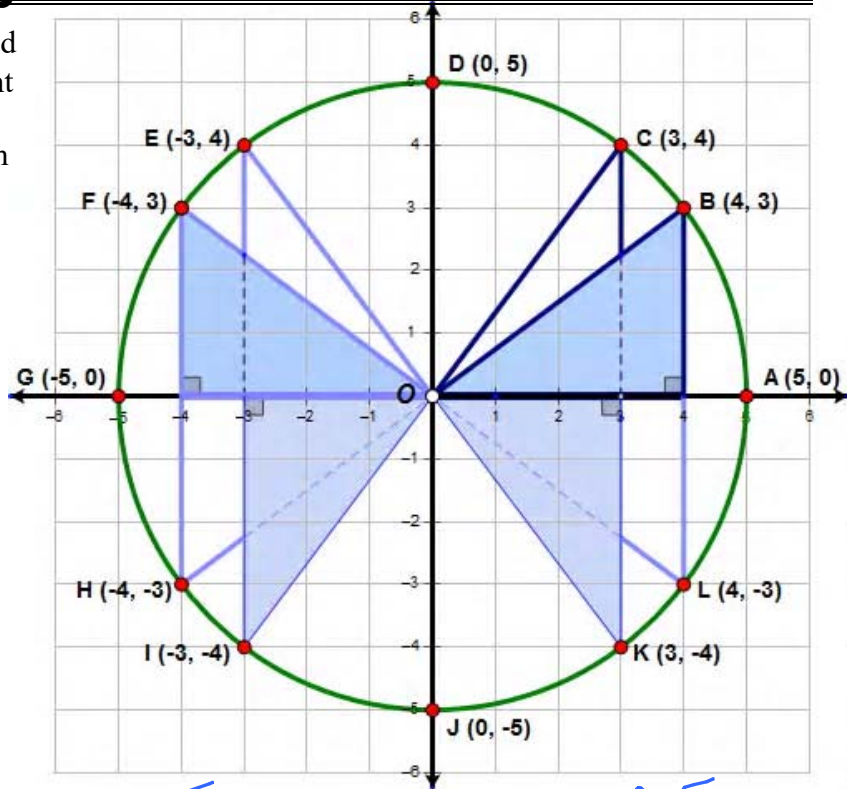
How would you find the length of segment OB?

We could use the distance formula or the pythagorean theorem.

$$4^2 + 3^2 = c^2$$

$$25 = c^2$$

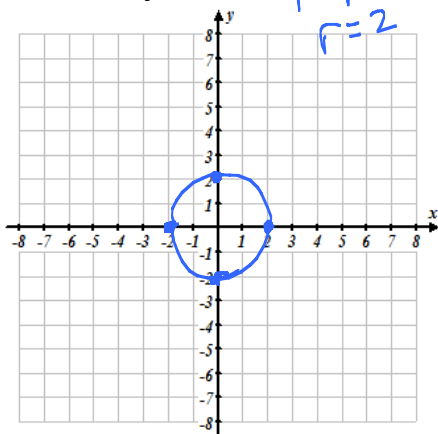
$$5 = c$$



1. **Basic Circles** Graph the following:

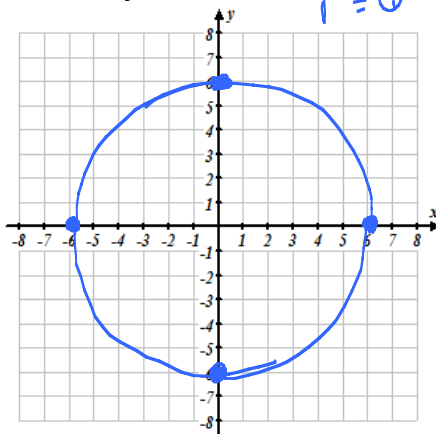
A. $x^2 + y^2 = 4$

$r = \sqrt{4}$
 $r = 2$



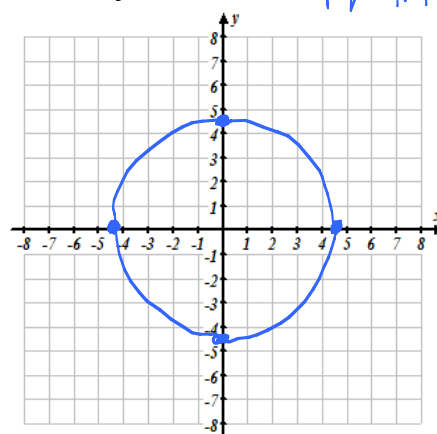
B. $x^2 + y^2 = 36$

$r = \sqrt{36}$
 $r = 6$



C. $x^2 + y^2 = 20$

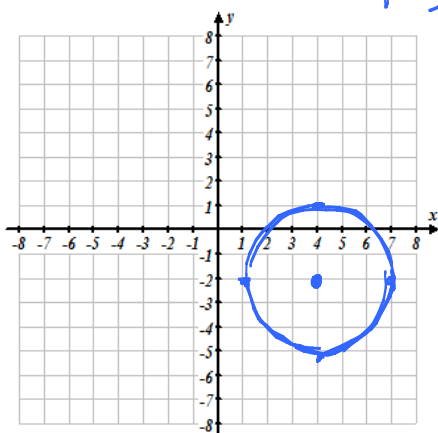
$r = \sqrt{20}$
 $r \approx 4.47$



2. **Translated Circles** Graph the following:

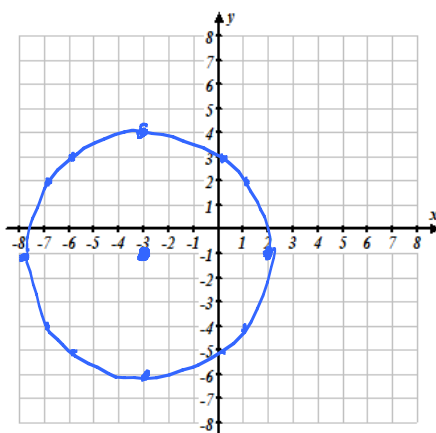
A. $(x-4)^2 + (y+2)^2 = 9$

$r = \sqrt{9}$
 $r = 3$



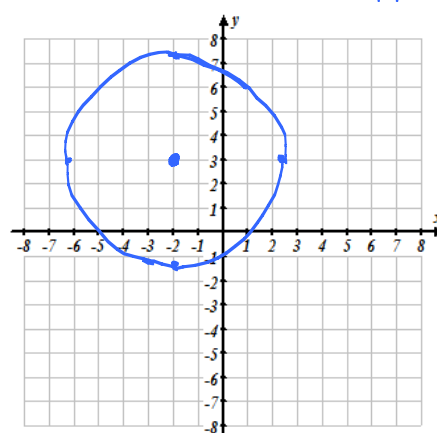
B. $(x+3)^2 + (y+1)^2 = 25$

$r = \sqrt{25}$
 $r = 5$

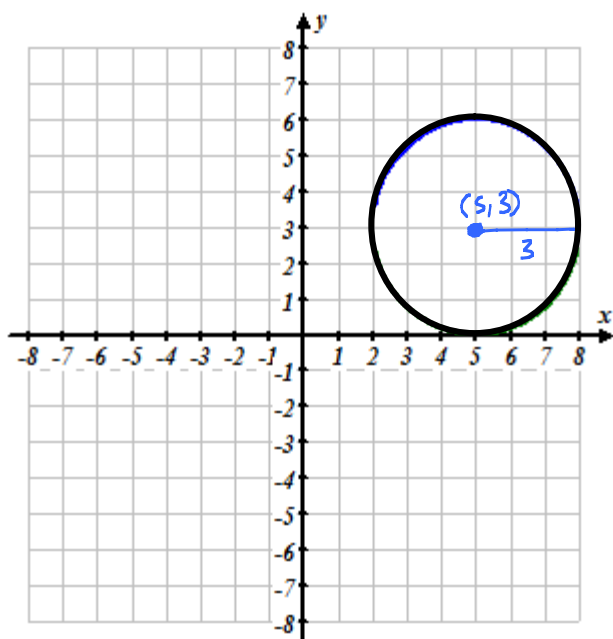


C. $(x+2)^2 + (y-3)^2 = 18$

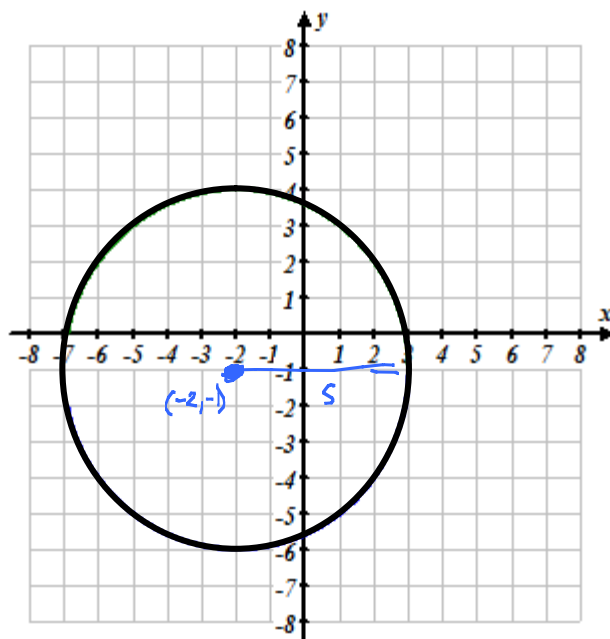
$r = \sqrt{18}$
 $r \approx 4.2$



3. **Equations of Circles** Find the equation of each of the following:



a. $(x - 5)^2 + (y - 3)^2 = 9$



b. $(x + 2)^2 + (y + 1)^2 = 25$

4. **Equations of Circles** The following design is composed of 3 full circles and 2 semi-circles. Can you find the equations of each and put them in your calculator?

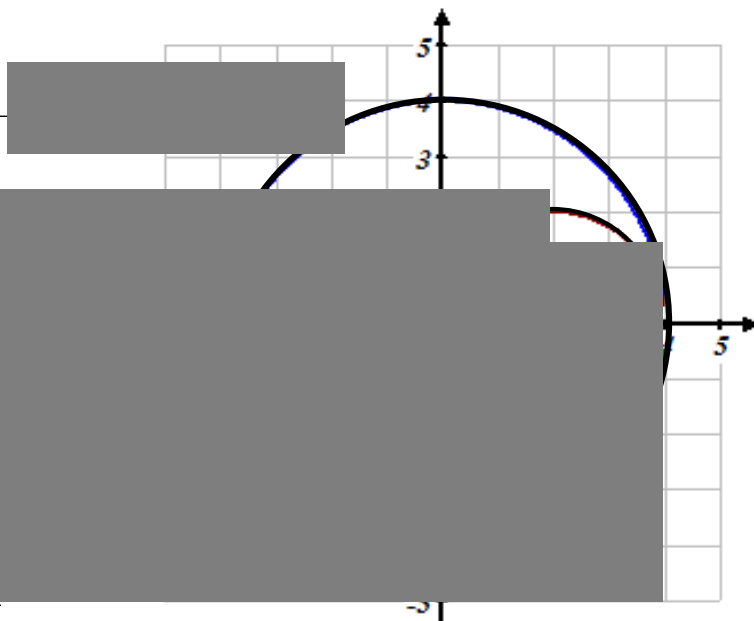
a. $(x + 0)^2 + (y + 0)^2 = 16$

b. $(x - 2)^2 + (y + 0)^2 = .25$

c. $(x + 2)^2 + (y + 0)^2 = .25$

d. $(x + 2)^2 + (y + 0)^2 = 4$

e. $(x - 2)^2 + (y + 0)^2 = 4$

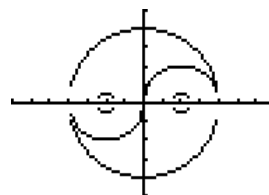


** When you put these in your TI-83/84 calculator you will have to solve for y using the square root method you may have to use two equations to describe a complete circle. For example if you wanted to graph the

complete circle $(x - 4)^2 + (y + 2)^2 = 9$. It would require that you use two equations $y_1 = \sqrt{9 - (x - 4)^2} - 2$ and

$y_2 = -\sqrt{9 - (x - 4)^2} - 2$

Plot1	Plot2	Plot3	Plot1	Plot2	Plot3
$\sqrt{Y_1} = (-1, 1) \sqrt{(16 - X^2)}$			$\sqrt{Y_4} = (-1, 1) \sqrt{(4 - (X + 2)^2)}$		
$\sqrt{Y_2} = (-1, 1) \sqrt{(.25 - (X - 2)^2)}$			$\sqrt{Y_5} = (-1, 1) \sqrt{(4 - (X - 2)^2)}$		
$\sqrt{Y_3} = (-1, 1) \sqrt{(.25 - (X + 2)^2)}$			$\sqrt{Y_6} =$		
			$\sqrt{Y_7} =$		
			$\sqrt{Y_8} =$		
			$\sqrt{Y_9} =$		

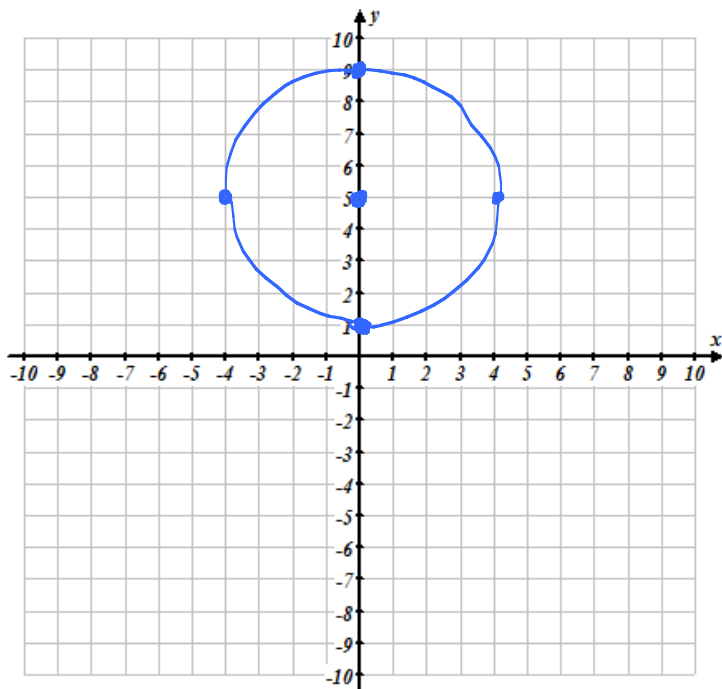


5. Finding Standard form of circles. Put the following circles in standard form and graph them.

A. $x^2 + y^2 - 10y + 9 = 0$

$$x^2 + y^2 - 10y + 25 = -9 + 25$$

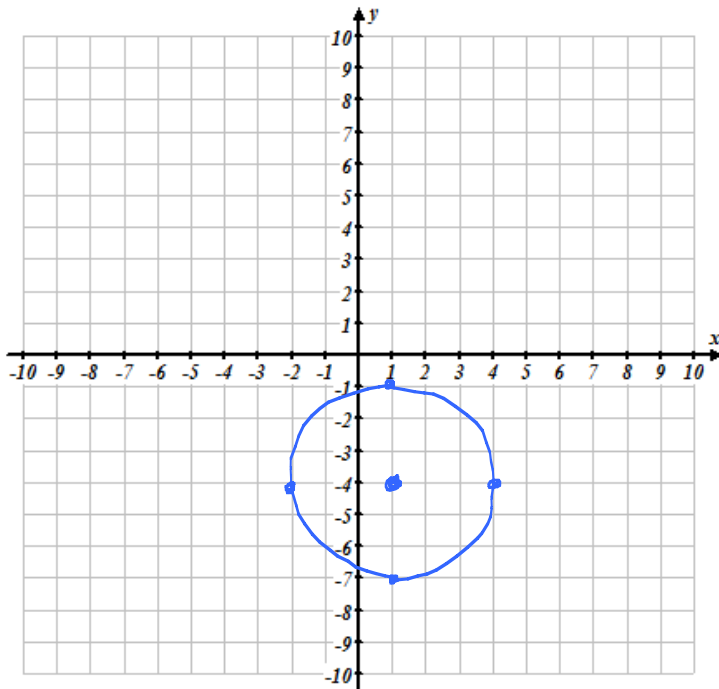
$$(x+0)^2 + (y-5)^2 = 16$$



B. $x^2 + y^2 - 2x + 8y = -8$

$$x^2 - 2x + 1 + y^2 + 8y + 16 = -8 + 1 + 16$$

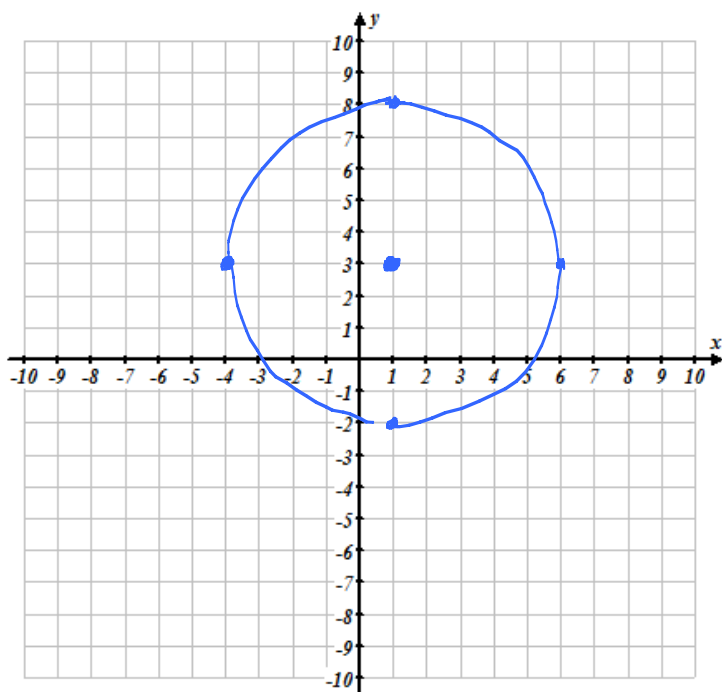
$$(x-1)^2 + (y+4)^2 = 9$$



C. $x^2 + y^2 - 6y - 2x = 15$

$$x^2 - 2x + 1 + y^2 - 6y + 9 = 15 + 1 + 9$$

$$(x-1)^2 + (y-3)^2 = 25$$



D. $2x^2 + 2y^2 - 8x + 12y = 6$

$$x^2 + y^2 - 4x + 6y = 3$$

$$x^2 - 4x + 4 + y^2 + 6y + 9 = 3 + 4 + 9$$

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

