Section 2.4 Circles MATH 161 THOMPSON

1) A circle is the set of all points in a plane that are the same distance from a fixed point.

The fixed point is called the center.

2) The distance from the center of a circle to any point of the circle is called the radius.

Circle form $x^2 + y^2 = r^2$ with center (0,0) radius r

3) State whether the following statement is true or false.

The radius of the circle $x^2 + y^2 = 9$ is 3.

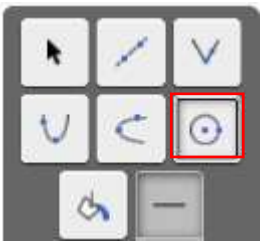
Choose the correct answer below.

- False
- True

4) Graph the circle.

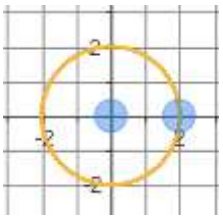
$x^2 + y^2 = 4$

Use the graphing tool on the right to graph the circle.



Click graph tool, then circle

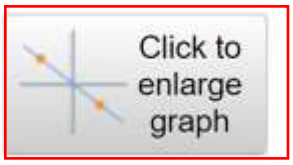
Click on the center then move out 2 units

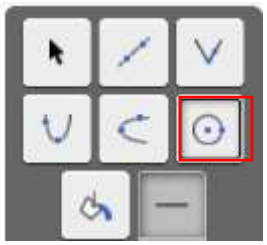


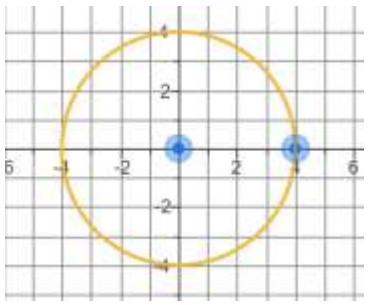
5) Find the center and radius then graph the circle.

$5x^2 + 5y^2 = 80$ Divide all by 5 $x^2 + y^2 = 16$, center (0,0) radius 4

Use the graphing tool to graph the circle.





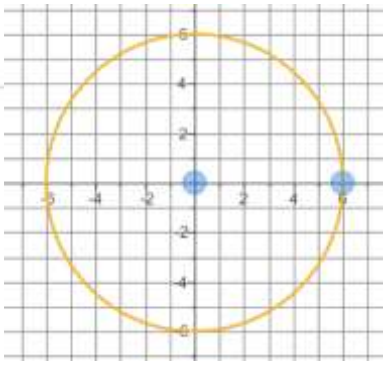


6) Write an equation of the circle with the center (0,0) and radius $\sqrt{14}$. $\sqrt{14}^2 = 14$

The equation is $x^2 + y^2 = 14$. (Type your answer in standard form.)

7) Sketch the graph of the equation. If the graph is a parabola, find its vertex. If the graph is a circle, find its center and radius.

$x^2 + y^2 = 36$ center (0,0) radius 6



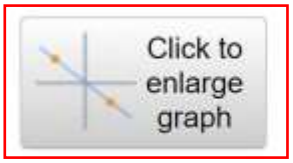
Use the graphing tool to graph the equation.

B. The graph is a circle with radius 6.
(Simplify your answer. Type an exact answer, using radicals as needed.)
The center is located at (0,0).
(Type an ordered pair.)

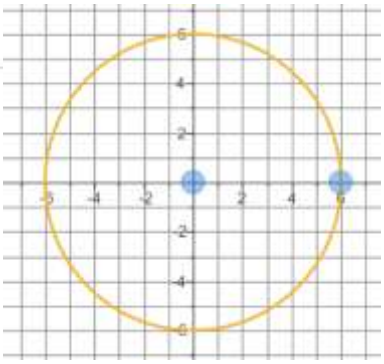
8) Sketch the graph of the equation. If the graph is a parabola, find its vertex. If the graph is a circle, find its center and radius.

$2x^2 + 2y^2 = 72$ Divide all terms by 2 first

Use the graphing tool to graph the equation.



$x^2 + y^2 = 36$
center (0,0)
radius 6



B. The graph is a circle with center (0,0).
(Type an ordered pair.)
The radius is 6.
(Simplify your answer. Type an exact answer, using radicals as needed.)

9) Find the equation of the circle having the given center and radius.

Center (0,0), radius 9 $x^2 + y^2 = r^2$

Write the equation of the circle.

$x^2 + y^2 = 81$ (Simplify your answer.)

10) Find an equation of the circle having the given center that passes through the given point.

The center is (0, 0) and the point is (−1, 5). radius is distance

Write the equation for the circle.

$\sqrt{(-1)^2 + 5^2} = \sqrt{26}$

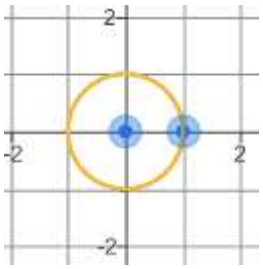
$x^2 + y^2 = 26$ (Simplify your answer.)

*shortcut: square both and add

11) Write the standard form of the equation of the circle of radius r = 1 and center (h,k) = (0,0). Graph the circle.

The standard form of the equation of this circle is $x^2 + y^2 = 1$.

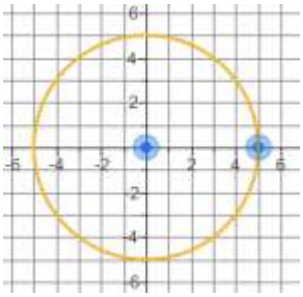
Use the graphing tool to graph a circle with center (0,0) and a radius of 1.



12) A circle has the equation $x^2 + y^2 = 25$.
(a) Find the center (h,k) and radius r of the circle.
(b) Graph the circle.
(c) Find the intercepts, if any, of the graph.

(a) The center of the circle is (0,0).
(Type an ordered pair, using integers or decimals.)

The radius of the circle is 5.
(Type an integer or a decimal.)



(b) Use the graphing tool to graph the circle.

(c) What are the intercepts? Select the correct choice below and, if necessary, fill in the answer box within your choice.

- A. The intercept(s) is/are $(-5,0),(0,5),(5,0),(0,-5)$.
  (Type an ordered pair. Use a comma to separate answers as needed. Type exact answers for each coordinate, using radicals as needed.)
- B. There are no intercepts.

Circle form $(x-h)^2 + (y-k)^2 = r^2$ with center (h,k) radius r

13) State whether the following statement is true or false.

The center of the circle $(x+3)^2 + (y-2)^2 = 13$ is $(3,-2)$.

Choose the correct answer below.

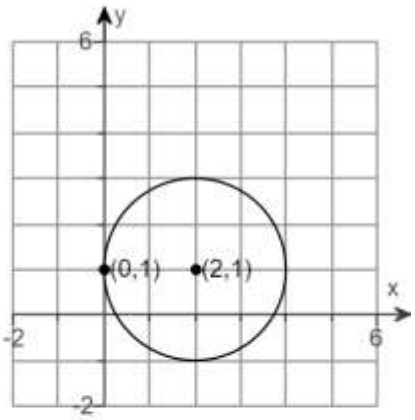
- True
- False

14) Choose the equation of a circle with radius 5 and center $(2, -4)$.

Choose the correct answer below.

- A. $(x+2)^2 + (y-4)^2 = 25$
- B. $(x-2)^2 + (y+4)^2 = 25$ ✔
- C. $(x-2)^2 + (y+4)^2 = 5$
- D. $(x+2)^2 + (y-4)^2 = 5$

15) Find the center and radius of the circle. Write the standard form of the equation.

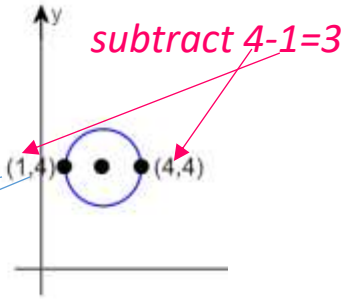


The center of the circle is (h,k) = (2,1).
(Type an ordered pair.)

The radius of the circle is r = 2.

The equation of the circle in standard form is $(x-2)^2 + (y-1)^2 = 4$.
(Type your answer in standard form.)

Find the center and radius of the circle. Write the standard form of the equation.



subtract 4-1=3

4-1=3 then divide by 2

radius is $\frac{3}{2}$

center: add 1 to $\frac{3}{2}$ = $\frac{5}{2}$

The center of the circle is $\left(\frac{5}{2}, 4\right)$.

(Type an ordered pair.)

The radius of the circle is $\frac{3}{2}$.

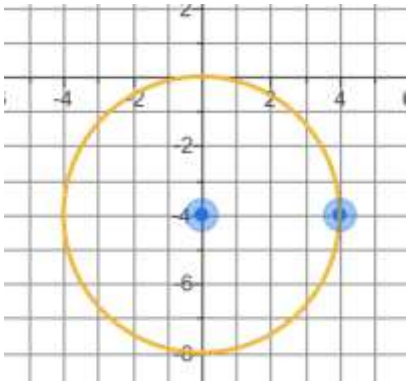
The standard form of the equation is $\left(x-\frac{5}{2}\right)^2 + (y-4)^2 = \frac{9}{4}$.

17) Write the standard form of the equation of the circle with radius r and center (h,k). Then graph the circle.

$r = 4$; $(h,k) = (0, -4)$

The standard form of the equation of this circle is $x^2 + (y+4)^2 = 16$.

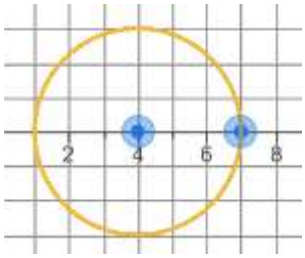
Graph the circle.



18) A circle has the equation $2(x-4)^2 + 2y^2 = 18$.
(a) Find the center (h,k) and radius r of the circle.
(b) Graph the circle.
(c) Find the intercepts, if any, of the graph.

(a) The center of the circle is $(4,0)$.
(Type an ordered pair, using integers or decimals.)

The radius of the circle is 3.
(Type an integer or a decimal.)



(b) Use the graphing tool to graph the circle.

(c) What are the intercepts? Select the correct choice below and, if necessary, fill in the answer box within your choice.

A. The intercept(s) is/are $(1,0),(7,0)$.
(Type an ordered pair. Use a comma to separate answers as needed. Type exact answers for each coordinate, using radicals as needed.)

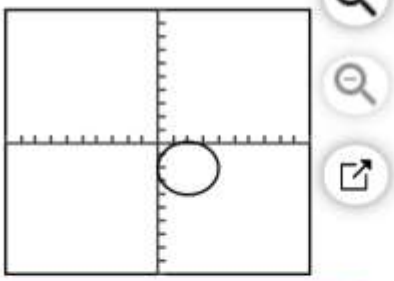
B. There are no intercepts.

19) Match each graph with the correct equation.

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

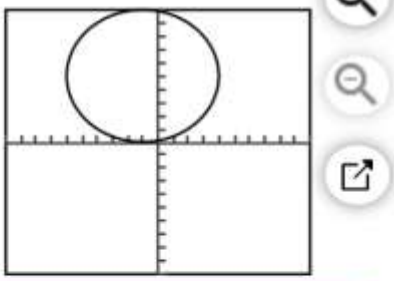
Drag each of the equations given above into the appropriate area below. Each grap

(a)



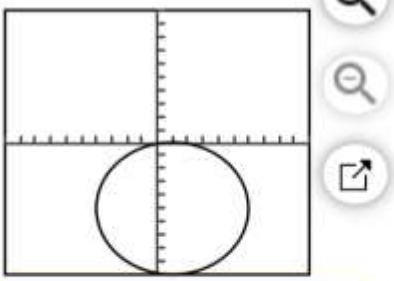
$(x-2)^2+(y+2)^2=4$

(b)



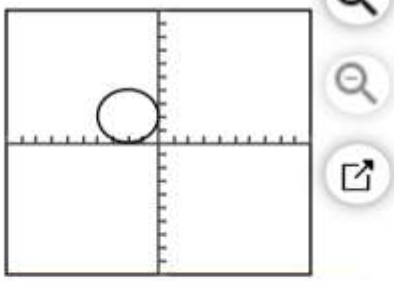
$(x+1)^2+(y-5)^2=25$

(c)



$(x-1)^2+(y+5)^2=25$

(d)



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