Geometry 1.2
Class-Notes

Name_____
Date_____Period_____

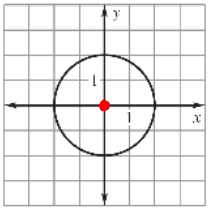
10.7: Write and Graph Equations of Circles

Goal • Write equations of circles in the coordinate plane.

Standard Equation of a Circle: WITH CENTER AT ORIGIN (0,0)

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

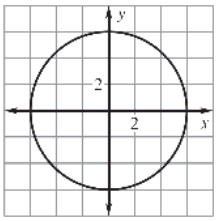
Example 1: ***Write an equation of a circle with center in the origin.***



Radius 2 Center (0,0)

Standard Equation $x^2 + y^2 = 4$

✔ ***Checkpoint*** **:** Write an equation of the circle shown.



Radius 6 Center (0,0)

Standard Equation $x^2 + y^2 = 36$

STANDARD EQUATION OF A CIRCLE with center not in the origin.

The standard equation of a circle with center (h, k) and radius r is: $(x-h)^2+(y-k)^2=r^2$

Example 2: Write the standard equation of a circle with (0, –5) and radius 3.7.

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

$x^2+(y+5)^2=3.7^2$

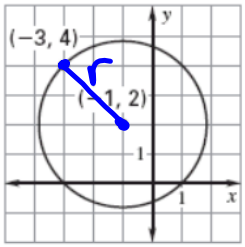
$x^2+(y+5)^2=13.69$

Checkpoint **:** Write the standard equation of a circle with center (–3, –5) and radius 6.1.

$(x+3)^2+(y+5)^2=37.21$ 6.1^2

Example 3: ***Write the standard equation of a circle from a graph.***

1. The point (–3, 4) is on a circle with center (–1, 2).



? $(x+1)^2+(y-2)^2=8$

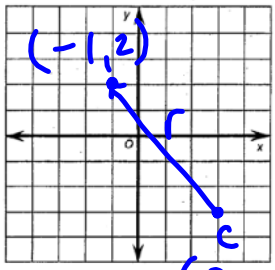
$r=\sqrt{(-3-(-1))^2+(4-2)^2}$

$\sqrt{(-2)^2+2^2}=\sqrt{8}=r$

$r^2=(\sqrt{8})^2$

$=8$

2. The point (–1, 2) is on a circle with center (3, –3).



$(x-3)^2+(y+3)^2=41$

$r=\sqrt{(-1-3)^2+(2+3)^2}$

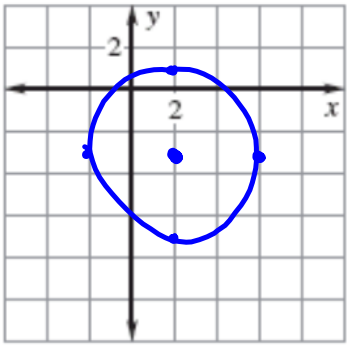
$=\sqrt{(-4)^2+5^2}=\sqrt{16+25}=\sqrt{41}=r$

If you know the equation of a circle, you can graph the circle by identifying its center and radius.

Example 4: ***Graph a circle***

1. The equation of a circle is $(x-2)^2+(y+3)^2=16$.

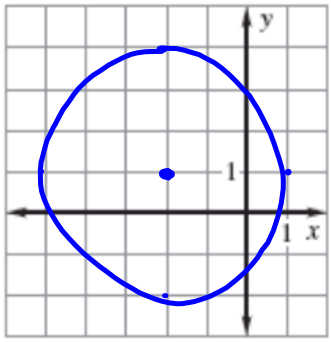
Graph the circle.
The center is (2 , -3) and the radius is 4 .
Use a compass to graph the circle.



2. The equation of the circle is $(x + 2)^2 + (y - 1)^2 = 9$.

Graph the circle.

The center is (-2 , 1) and the radius is 3.



Name _____ Date _____

LESSON 10.7

Practice A

For use with pages 699–705

Match the equation of a circle with its description.

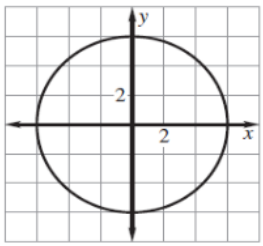
1. $x^2 + y^2 = 4$
2. $x^2 + y^2 = 9$
3. $(x + 1)^2 + (y - 4)^2 = 16$
4. $(x + 2)^2 + (y + 3)^2 = 9$
5. $(x + 3)^2 + (y - 5)^2 = 16$
6. $(x - 2)^2 + (y - 5)^2 = 9$

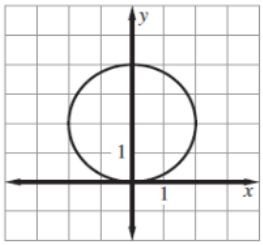
A. center $(-1, 4)$, radius 4
B. center $(-2, -3)$, radius 3
C. center $(0, 0)$, radius 2
D. center $(2, 5)$, radius 3
E. center $(-3, 5)$, radius 4
F. center $(0, 0)$, radius 3

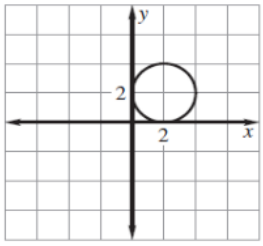
Give the center and radius of the circle.

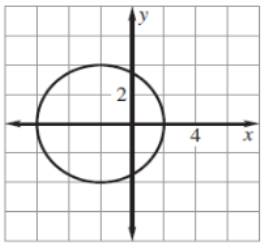
7. $x^2 + y^2 = 25$
8. $x^2 + (y - 4)^2 = 9$
9. $(x - 5)^2 + y^2 = 16$
10. $(x + 1)^2 + (y - 1)^2 = 4$
11. $(x - 2)^2 + (y - 4)^2 = 16$
12. $(x + 4)^2 + (y - 2)^2 = 25$

Write the standard equation of the circle.

13. 

14. 

15. 

16. 

Write the standard equation of the circle with the given center and radius.

17. Center $(0, 0)$, radius 2
18. Center $(0, 3)$, radius 2

21. Center $(0, 9)$, radius 7
22. Center $(-3, 7)$, radius 6

Use the given information to write the standard equation of the circle.

25. The center is (0, 0), and a point on the circle is (7, 0).

27. The center is (2, 4), and a point on the circle is (2, 7).

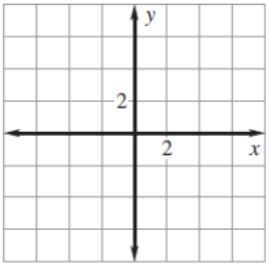
Determine the diameter of the circle with the given equation.

29. $x^2 + y^2 = 9$

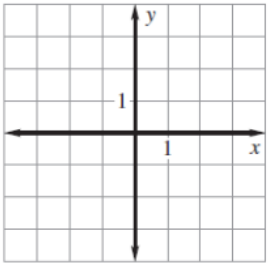
30. $(x + 2)^2 + (y + 1)^2 = 1$

Graph the equation.

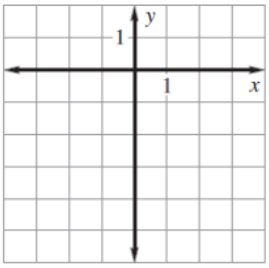
33. $x^2 + y^2 = 25$



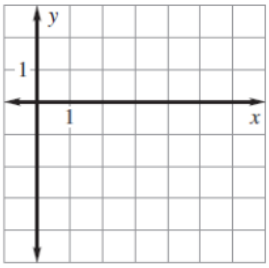
34. $(x - 1)^2 + y^2 = 4$



35. $x^2 + (y + 2)^2 = 9$



36. $(x - 3)^2 + (y + 1)^2 = 4$



Determine whether the point lies on the circle described by the equation $(x - 2)^2 + (y - 6)^2 = 25$.

37. (2, 6)

39. (4, 2)

Lesson 10.7

Practice Level A

1. C **2.** F **3.** A **4.** B **5.** E **6.** D **7.** $(0, 0)$; 5

8. $(0, 4)$; 3 **9.** $(5, 0)$; 4 **10.** $(-1, 1)$; 2

11. $(2, 4)$; 4 **12.** $(-4, 2)$; 5 **13.** $x^2 + y^2 = 36$

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

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

16. $(x + 2)^2 + y^2 = 16$ **17.** $x^2 + y^2 = 4$

18. $x^2 + (y - 3)^2 = 4$ **19.** $(x - 2)^2 + y^2 = 9$

20. $(x - 5)^2 + (y + 6)^2 = 1$

21. $x^2 + (y - 9)^2 = 49$

22. $(x + 3)^2 + (y - 7)^2 = 36$

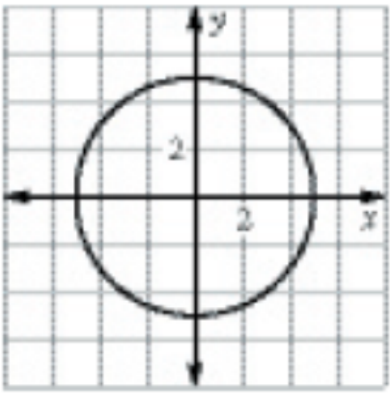
23. $x^2 + y^2 = 100$ **24.** $(x + 5)^2 + (y + 1)^2 = 64$

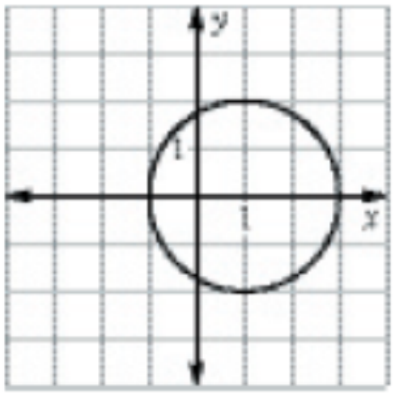
25. $x^2 + y^2 = 49$ **26.** $x^2 + y^2 = 25$

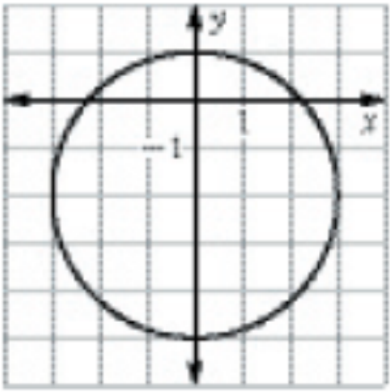
27. $(x - 2)^2 + (y - 4)^2 = 9$

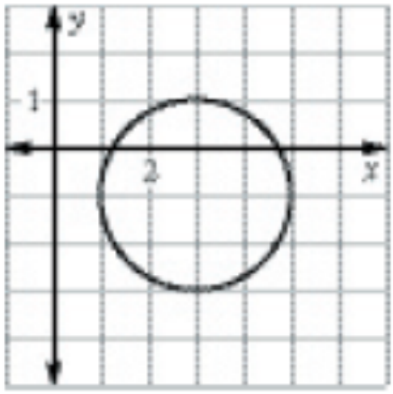
28. $(x + 1)^2 + (y - 2)^2 = 25$ **29.** 6 **30.** 2

31. 8 **32.** $4\sqrt{2}$

33. 

34. 

35. 

36. 

37. No; (2, 6) is the center. **38.** yes **39.** no

40. yes **41.** $(x - 48)^2 + (y - 24)^2 = 64$