Practice

Circles in the Coordinate Plane

Write an equation of a circle with the given center and radius. Check your answers.

1. center $(0, 0)$, radius 3

$x^2 + y^2 = 9$

2. center $(0, 1)$, radius 2

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

3. center $(-1, 0)$, radius 6

$(x + 1)^2 + y^2 = 36$

4. center $(2, 0)$, radius 1

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

5. center $(1, -5)$, radius 2.5

$(x - 1)^2 + (y + 5)^2 = 6.25$

6. center $(2, 3)$, diameter 1

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

Write an equation for each translation.

7. $x^2 + y^2 = 9$; right 4 and down 2

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

8. $x^2 + y^2 = 12$; left 2 and up 5

$(x + 2)^2 + (y - 5)^2 = 12$

9. $x^2 + y^2 = 49$; right 1 and up 7

$(x - 1)^2 + (y - 7)^2 = 49$

10. $x^2 + y^2 = 1$; right 5 and up 5

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

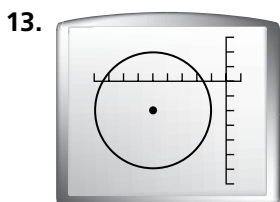**11.** $x^2 + y^2 = 25$; up 10

$x^2 + (y - 10)^2 = 25$

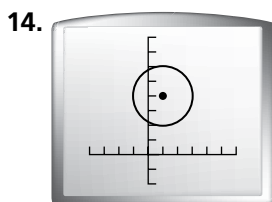**12.** $x^2 + y^2 = 36$; left 8 and down 6

$(x + 8)^2 + (y + 6)^2 = 36$

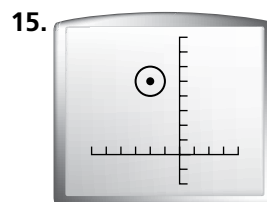**Write an equation for each circle. Each interval represents one unit.**

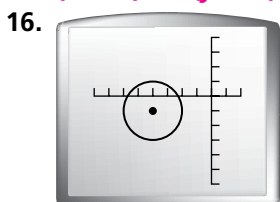**13.**

x scale = 1   y scale = 1

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

14.

x scale = 1   y scale = 1

$(x - 1)^2 + (y - 4)^2 = 4$
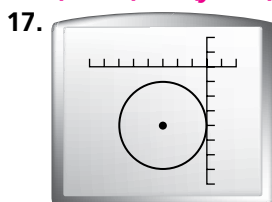
15.

x scale = 1   y scale = 1

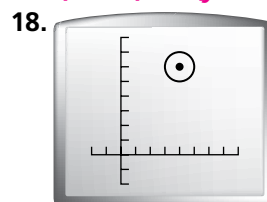$(x + 2)^2 + (y - 5)^2 = 1$

16.

x scale = 1   y scale = 1

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

17.

x scale = 1   y scale = 1

$(x + 3)^2 + (y + 4)^2 = 9$

18.

x scale = 1   y scale = 1

$(x - 4)^2 + (y - 6)^2 = 1$

For each equation, find the center and radius of the circle.

19. $(x + 1)^2 + (y - 8)^2 = 1$ $(-1, 8); 1$

20. $x^2 + (y + 3)^2 = 9$ $(0, -3); 3$

21. $(x + 3)^2 + (y + 1)^2 = 2$ $(-3, -1); \sqrt{2}$

22. $(x - 6)^2 + y^2 = 5$ $(6, 0); \sqrt{5}$

23. $(x - 6)^2 + (y - 9)^2 = 4$ $(6, 9); 2$

24. $x^2 + y^2 = 144$ $(0, 0); 12$
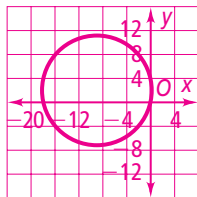
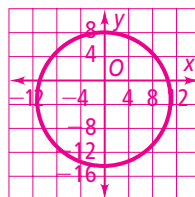# Practice (continued)   *Form G*

Circles in the Coordinate Plane

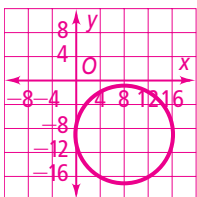**Use the center and the radius to graph each circle.**

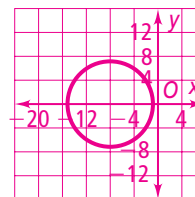**25.** $(x + 9)^2 + (y - 2)^2 = 81$

26. $x^2 + (y + 3)^2 = 121$

27. $(x - 8)^2 + (y + 9)^2 = 64$

28. $(x + 8)^2 + y^2 = 49$

29. Writing Describe in words how to change the equation of a circle with the center at the origin and radius 5 to a circle with the center 3 units right and 2 units up. **Answers may vary. Sample: Write the equation of a circle with the center at the origin and radius 5: $x^2 + y^2 = 25$. Then write the equation with the center at (3, 2) with radius 5, using the equation in standard form with $h = 3$ and $k = 2$ to translate the circle: $(x - 3)^2 + (y - 2)^2 = 25$.**

30. Open-Ended Write an equation for a circle with center at the origin and an equation for another circle that is a translation of the first. **Answers may vary. The circle with the center at the origin should be in the form $x^2 + y^2 = r^2$ and the circle that is translated should have the same value for r as the original circle.**

31. Error Analysis A classmate writes the equation of a circle with the center at (8.5, 0) and diameter 25 as $x + (y - 8.5)^2 = 156.25$. Is she correct? Why or why not? **This is the incorrect equation for the circle. The values for h and k are reversed and x should be squared. The correct equation is $(x - 8.5)^2 + y^2 = 156.25$.**

32. Reasoning How can you determine if the graph of the circle $(x + 8)^2 + (y + 9)^2 = 49$ is correctly drawn? **Check that the center of the circle is $(-8, -9)$ and that the radius of the circle is 7.**