Pg 629
10-52 by 4's, 62, 63, (60, 61)

GRAPHING Graph the equation. Identify the radius of the circle.

9. $x^2 + y^2 = 1$
10. $x^2 + y^2 = 81$
11. $x^2 + y^2 = 25$
12. $x^2 + y^2 = 12$
13. $y^2 = 27 - x^2$
14. $x^2 = -y^2 + 40$
15. $x^2 = 15 - y^2$
16. $y^2 = -x^2 + 9$
17. $15x^2 + 15y^2 = 60$
18. $7x^2 + 7y^2 = 112$
19. $4x^2 + 4y^2 = 128$
20. $8x^2 + 8y^2 = 192$

21. ★ **MULTIPLE CHOICE** What is the radius of the circle $3x^2 + 3y^2 = 54$?

Ⓐ $3\sqrt{2}$ Ⓑ $3\sqrt{6}$ Ⓒ 18 Ⓓ 54

WRITING EQUATIONS Write the standard form of the equation of the circle with the given radius and whose center is the origin.

22. 12
23. 8
24. 2
25. 16
26. $\sqrt{2}$
27. $\sqrt{15}$
28. $5\sqrt{2}$
29. $4\sqrt{6}$

30. **ERROR ANALYSIS** *Describe* and correct the error in writing an equation of the circle with the given center and radius.

Center: (0, 0); Radius: 12
Equation: $x^2 + y^2 = 12$ ✗

WRITING EQUATIONS Write the standard form of the equation of the circle that passes through the given point and whose center is the origin.

31. (−6, 0)
32. (0, 5)
33. (−4, 3)
34. (2, −4)
35. (−6, 8)
36. (−9, 2)
37. (4, −10)
38. (−8, −5)
39. (−8, 14)
40. (5, −12)
41. (−11, −11)
42. (9, 40)

43. ★ **MULTIPLE CHOICE** What is the equation in standard form of the circle that passes through the point (4, −6) and whose center is the origin?

Ⓐ $x^2 + y^2 = 5$ Ⓑ $x^2 + y^2 = 10$ Ⓒ $x^2 + y^2 = 52$ Ⓓ $x^2 + y^2 = 2\sqrt{13}$

GRAPHING In Exercises 44–52, equations of both circles and parabolas are given. Graph the equation.

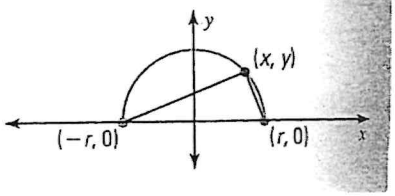
44. $y^2 + x^2 = 49$
45. $4x^2 + y = 0$
46. $7x^2 + 7y^2 = 63$
47. $y^2 - 121 = -x^2$
48. $x^2 + 16y = 0$
49. $3x = -y^2$
50. $12x^2 + 12y^2 = 192$
51. $2x^2 + 2y^2 = 16$
52. $6x + 6y^2 = 0$

TANGENT LINES Write an equation of the line tangent to the given circle at the given point.

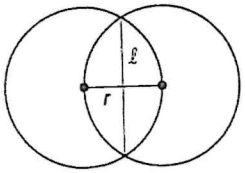
53. $x^2 + y^2 = 17$; (1, 4)
54. $x^2 + y^2 = 13$; (2, −3)
55. $x^2 + y^2 = 34$; (−5, 3)
56. $x^2 + y^2 = 40$; (−6, −2)
57. $x^2 + y^2 = 106$; (−5, 9)
58. $x^2 + y^2 = 250$; (15, 5)

59. ★ **OPEN-ENDED MATH** Write equations in standard form for three circles centered at the origin so that each circle passes between (−3, 5) and (−6, 2).

60. **REASONING** Use the diagram to show that an angle inscribed in a semicircle is a right angle. (*Hint:* Show that the segments meeting at (x, y) have slopes that are negative reciprocals.)



61. **CHALLENGE** Suppose two congruent circles intersect so that each passes through the other's center, as shown. Write an equation that gives the length ℓ of the chord formed by joining the intersection points in terms of the radius r of each circle.



PROBLEM SOLVING

62. **CELL PHONES** A cellular phone tower services a 15 mile radius. On a hiking trip, you are 9 miles east and 11 miles north of the cell tower. Are you in the region served by the tower?

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63. **BATS** During the warmer months, more than 1 million Mexican free-tailed bats live under the Congress Avenue Bridge in Austin, Texas. The bats have an estimated feeding range of 50 miles. Is a location 40 miles north and 25 miles west of the bridge located within this range?

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