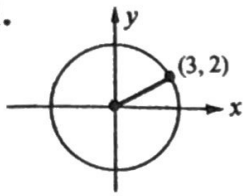
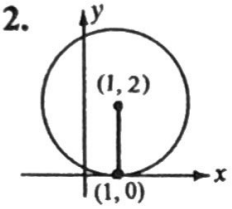
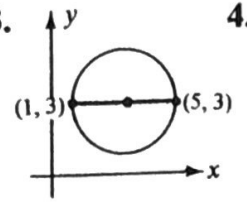
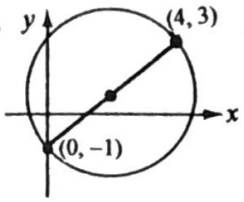
EXERCISES

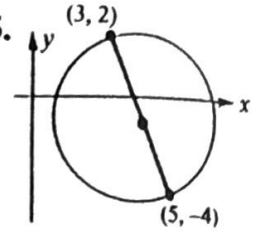
Write the equation in standard form of each circle.

1. 

2. 

3. 

4. 

5. 

Write the standard form of the equation of each circle.

6. $r = 1$; Center (0, 0)
7. $r = 1$; Center (0, 5)
8. $r = 1$; Center (−5, 0)
9. $r = 1$; Center (3, 5)
10. $r = 3$; Center (5, −3)
11. $r = 5$; Center (−3, 5)
12. $r = 8$; Center (−1, −6)
13. $r = \frac{1}{2}$; Center (4, −2)
14. $r = \frac{1}{2}$; Center $(\frac{1}{2}, 0)$

Find the center and radius of each circle.

15. $x^2 + y^2 = 16$
16. $x^2 + y^2 = 18$
17. $5x^2 + 5y^2 = 40$
18. $(x-4)^2 + y^2 = 36$
19. $x^2 + (y+6)^2 = 36$
20. $(x+4)^2 + (y-6)^2 = 18$
21. $3(x-4)^2 + 3y^2 = 54$
22. $4x^2 + 4(y+6)^2 = 40$
23. $9(x+4)^2 + 9(y-6)^2 = 90$
24. $x^2 + y^2 - 6x + 5 = 0$
25. $x^2 + y^2 + 4y = 0$
26. $x^2 + y^2 - 2x + 4y - 4 = 0$
27. $x^2 + y^2 + 2x + 4y = 9$
28. $x^2 + y^2 - 8x + 12y = -44$
29. $x^2 + 2\sqrt{5}x + y^2 = 4$

30. Find the equation in general form of the circle with center (3, 5) and tangent to the $x-$axis. (Hint: tangent line to a circle is the line that intersects the circle at only a single point.)
31. Find the equation in general form of the circle with center (3, 5) and tangent to the $y-$axis.
32. Find the equation of the line that is tangent to the circle $x^2 + y^2 = 34$ at point (3, 5).
33. Find the equation of the line that is tangent to the circle $x^2 + y^2 = 34$ at point (3, −5).
34. Find the equation of the line that is tangent to the circle $x^2 + y^2 = 16$ at point $(3, \sqrt{7})$.
35. Find the equation of the line that is tangent to the circle $x^2 + y^2 - 8x + 12y + 42 = 0$ at (5,−3).
36. Write the equation of the circle if the endpoints of the diameter are at (4, 5) and (−2, −1).
37. If the equation of the circle is $x^2 + y^2 = r^2$ and the point of tangent is $p(x_0, y_0)$, prove that the equation of the tangent line is $x_0x + y_0y = r^2$.
38. Use the formula described in Problem 37 to find the equation of the tangent line to the circle $x^2 + y^2 = 34$ and the point of tangent is (3, 5).
39. If the equation of the circle is $x^2 + y^2 = r^2$ and the slope of the tangent line is *m*, prove that: the equation of the tangent line is $y = mx \pm r\sqrt{1+m^2}$. (Hint: $D = b^2 - 4ac = 0$)
40. Use the formula described in Problem 39 to find the equation of the tangent line to the circle $x^2 + y^2 = 4$ from the point (0, 5) not on the circle.(See Chart of Tangent lines on page 301)