\[
\text{d = } \sqrt{(x_2-x_1)^2 + (y_2-y_1)^2}
\]
\[
d = \sqrt{(3-3)^2 + (1-5)^2}
\]
\[
d = \sqrt{36 + 36}
\]
\[
d = \sqrt{72}
\]
\[
d = 6\sqrt{2}
\]

---

**The Standard Form of the Equation of a Circle**

The standard form of the equation of a circle with center \((h, k)\) and radius \(r\) is:

\[(x - h)^2 + (y - k)^2 = r^2.\]

\[x^2 + y^2 = r^2\]

---

To graph a circle with a graphing utility, first solve the equation for \(y\).

\[x^2 + y^2 = 4\]
\[y^2 = 4 - x^2\]
\[y = \pm \sqrt{4 - x^2}\]

Graph the two equations:

\[y_1 = \sqrt{4 - x^2}\] and \[y_2 = -\sqrt{4 - x^2}\]

in the same viewing rectangle. The graph of \(y_1 = \sqrt{4 - x^2}\) is the top semicircle because \(y\) is always positive. The graph of \(y_2 = -\sqrt{4 - x^2}\) is the bottom semicircle because \(y\) is always negative. Use a **ZOOM SQUARE** setting so that the circle looks like a circle. (Many graphing utilities have problems connecting the two semicircles because the segments directly to the left and to the right of the center become nearly vertical.)
(x-2)^2 + (y+4)^2 = 4
center (2, -4)
radius \sqrt{4} = 2

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

(x+3)^2 + (y-4)^2 = 16
G(3, 4)

**Example 7** Modeling the Distance from the Origin to a Point on a Graph

Figure 1.84 shows that \( P(x, y) \) is a point on the graph of \( y = 1 - x^2 \). Express the distance, \( d \), from \( P \) to the origin as a function of the point's \( x \)-coordinate.

\[
  d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}
\]

\[
  d = \sqrt{(x - 0)^2 + (y - 0)^2}
\]

\[
  d = \sqrt{x^2 + y^2}
\]

\[
  d = \sqrt{x^2 + (1-x^2)^2}
\]

\[
  d = \sqrt{x^2 + 1 - 2x^2 + x^4}
\]

\[
  d = \sqrt{x^4 - x^2 + 1}
\]

\[(1-x^2)(1-x^2) \quad 1-2x^2+x^4\]
Homework

1.10  page 261
3-25 odd

1.10  page 263
27-45 odd