

Lesson 13-1

Example 1

Write an equation for a circle with a radius of 7 units and center at $(0, 0)$.

Solution

Because the center is at the origin, substitute in the equation $x^2 + y^2 = r^2$.

$$x^2 + y^2 = 7^2 \text{ or}$$

$$x^2 + y^2 = 49$$

Example 2

ASTRONOMY An astronomer is creating a computer model of a moon by entering the equation for a circle with a radius of 3 units and the center located at point $(-4, 3)$. Write the equation.

Solution

Substitute into the standard form for the equation of a circle.

$$\begin{aligned}(x - h)^2 + (y - k)^2 &= r^2 \\(x - (-4))^2 + (y - 3)^2 &= 3^2 \\(x + 4)^2 + (y - 3)^2 &= 3^2 \text{ or} \\(x + 4)^2 + (y - 3)^2 &= 9\end{aligned}$$

Example 3

GRAPHING Find the radius and center of the circle $x^2 + y^2 = 16$. Then graph the circle using a graphing calculator.

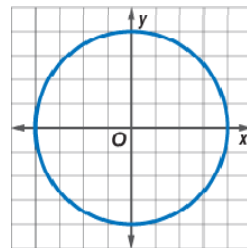
Solution

Because the equation is of the form $x^2 + y^2 = r^2$, the center is at the origin.

$$\begin{aligned}x^2 + y^2 &= r^2 \\x^2 + y^2 &= 16 \\r^2 &= 16 \\r &= 4\end{aligned}$$

To graph a circle using a graphing calculator, rewrite the equation in terms of y .

$$\begin{aligned}x^2 + y^2 &= 16 \\y^2 &= 16 - x^2 \\y &= \pm\sqrt{16 - x^2}\end{aligned}$$

**Example 4**

Find the radius and center of the circle $(x + 3)^2 + (y - 2)^2 = 24$.

Solution

Substitute into the standard form for the equation of a circle.

$$\begin{aligned}(x - h)^2 + (y - k)^2 &= r^2 \\(x - (-3))^2 + (y - 2)^2 &= (\sqrt{24})^2\end{aligned}$$

The center (h, k) is $(-3, 2)$. The radius is $\sqrt{24}$ or $2\sqrt{6}$.