General Equation of a Circle
Preliminaries and Objectives

Preliminaries

• Pythagorean Theorem
• Transformation of graphs (shifting horizontally and vertically)

Objectives

• Find the equation of a circle, given the center and the radius.
A circle is the set of all points located a fixed distance from some fixed point.

The fixed distance is called the radius of the circle.

The fixed point is called the center of the circle.
Circle centered at the origin

General Equation of a Circle

$x^2 + y^2 = 25$
Circle centered at the origin

The general equation of a circle is:

\[ x^2 + y^2 = r^2 \]
Center at \((h, k)\)

\[(x - 3)^2 + (y - 2)^2 = 9\]
Center at \((h, k)\)

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

General Form of a Circle

The circle with center at \((h, k)\) and radius \(r\) has the equation

\[(x - h)^2 + (y - k)^2 = r^2\]
Sample Problem 1

Find the equation of a circle with center at \((-2, 1)\) and radius 4.

\[(x + 2)^2 + (y - 1)^2 = 16\]
Sample Problem 2

Find the center and radius of a circle given by the equation

$$(x + 6)^2 + (y + 3)^2 = 4$$

Solution:

Center = $(-6, -3)$; Radius = 2