Math 1014: Precalculus with Transcendentals
Ch. 2: Functions and Graphs
Sec. 2.8 (part 2): Distance and Midpoint Formulas; Circles

I. Review (from test 1 material)
   A. The Distance Formula
      The distance, \( d \), between the points \((x_1, y_1)\) and \((x_2, y_2)\) is
      \[ d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}. \]

   B. The Midpoint Formula
      The midpoint of the line segment between the points \((x_1, y_1)\) and \((x_2, y_2)\) is
      \[
      \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right).
      \]

II. Circles
   A. Definition
      A circle is a set of all points in a plane that are equidistant from a fixed point called the center. The fixed distance from the circle's center to any point on the circle is called the radius.

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

   C. Examples
      Identify the center and the radius of the circle and graph.
      1. \( x^2 + y^2 = 36 \)
         Center: ____________
         Radius: ____________

      2. \( (x - 3)^2 + (y + 2)^2 = 4 \)
         Center: ____________
         Radius: ____________
3. Write an equation of the circle that has a center of (-1,3) and a radius of 5 and graph.

Complete the square to put the circle in standard form. Identify the center and the radius of the circle and graph.

4. $x^2 + y^2 + 8x + 4y + 16 = 0$

5. $x^2 + y^2 - 6y - 7 = 0$