# Unit 6 Lesson 6: Completing the Square

## 1 Fill in the Box (Warm up)

**Student Task Statement**

For each expression, what value would need to be in the box in order for the expression to be a perfect square trinomial?

1. $x^2 + 10x + \boxed{\phantom{0}}$

2. $x^2 - 16x + \boxed{\phantom{0}}$

3. $x^2 + 40x + \boxed{\phantom{0}}$

4. $x^2 + 5x + \boxed{\phantom{0}}$

## 2 Complete the Process

**Student Task Statement**

Here is the equation of a circle: $x^2 + y^2 - 6x - 20y + 105 = 0$

Elena wants to find the center and radius of the circle. Here is what she's done so far.

Step 1: $x^2 - 6x + y^2 - 20y = \text{-}105$

Step 2: $x^2 - 6x + 9 + y^2 - 20y + 100 = \text{-}105 + 9 + 100$

Step 3: $x^2 - 6x + 9 + y^2 - 20y + 100 = 4$

1. What did Elena do in the first step?

2. Why did Elena add 9 and 100 to the *left* side of the equation in Step 2?

3. Why did Elena add 9 and 100 to the *right* side of the equation in Step 2?

4. What should Elena do next?

5. What are the center and radius of this circle?

6. Draw a graph of the circle.

# 3 Your Turn

## Student Task Statement

Here is the equation of a circle: $x^2 + y^2 - 2x + 4y - 4 = 0$

1. Find the center and radius of the circle. Explain or show your reasoning.

2. Draw a graph of the circle.

## Activity Synthesis