## 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. $x^{2}+10x+$
2. $x^{2}−16x+$
3. $x^{2}+40x+$
4. $x^{2}+5x+$

### 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: $x^{2}−6x+y^{2}−20y=-105$

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

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





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