

## Practice Problems - Lecture 11

Instructions: On a separate sheet of paper, complete the following problems by writing out full solutions. Some questions may require minimal work, but write enough to communicate to me that you understand the solution. You may consult your notes, work with other students, and ask me for help during class or office hours, but your submitted work should be yours alone according to the UF honor code. The assignment is due at the beginning of class on Monday, October 12 and is worth 5 points.

**Problem 1.** Find the center-radius form of the equation of the circle, and then graph it:

- (a) center  $(0, 0)$ , radius 9;
- (b) center  $(3, 0)$ , radius 3;
- (c) center  $(-3, -2)$ , radius 6.

**Problem 2.** For each equation in problem 1, rewrite the equation of the circle in general form.

**Problem 3.** Determine whether each equation has the graph of a circle, a point, or is nonexistent. If it is a circle, give its center and radius:

- (a)  $x^2 + y^2 + 8x - 6y + 16 = 0$ ;
- (b)  $x^2 + y^2 + 4x - 8y + 32 = 0$ ;
- (c)  $x^2 + y^2 + 4x + 4y + 8 = 0$ .

**Problem 4.** If the diameter of a circle has endpoints  $(5, 4)$  and  $(-3, -2)$ , find the center-radius form of the equation of the circle. (Hint: find the midpoint of the diameter, and the distance between the endpoints.)

Answers:

1. (a)  $x^2 + y^2 = 81$ ; (b)  $(x - 3)^2 + y^2 = 9$ ; (c)  $(x + 3)^2 + (y + 2)^2 = 36$ .
2. (a)  $x^2 + y^2 - 81 = 0$ ; (b)  $x^2 + y^2 - 6x = 0$ ; (c)  $x^2 + y^2 + 6x + 4y - 23 = 0$ .
3. (a) Circle with center  $(-4, 3)$  and radius 3; (b) nonexistent; (c) point  $(-2, -2)$ .
4.  $(x - 1)^2 + (y - 1)^2 = 25$