Mathematics 1275/D500, Spring 2017 **Quiz #4**
Instructor: Suman Ganguli **Wednesday, March 22** **Name:** ____________________

Run LaTeX again to produce the table

In order to receive full credit, you must **show all your work** and simplify your answers.

1. (2 points) Complete the following sentence: "The quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

gives the solutions of the equation ______________________________."

Solution: The quadratic formula gives the solutions of the equation $ax^2 + bx + c = 0$.

2. (4 points) Use the quadratic formula to find the solutions of the equation $x^2 - 8x + 1 = 0$:

Solution:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-(-4) \pm \sqrt{(-8)^2 - 4(1)(1)}}{2(1)} = \frac{4 \pm \sqrt{64 - 4}}{2} = \frac{4 \pm \sqrt{60}}{2} = \frac{8 \pm 2\sqrt{15}}{2} = 4 \pm \sqrt{15}$$

3. (4 points) Now let's solve the same equation by completing the square and using the square root property. First, we separate the constant term from the variable terms (i.e., move the constant term from the LHS to the RHS), yielding

$$x^2 - 8x = -1$$

a. Now complete the square on the LHS, i.e., compute the number that will make the LHS into a perfect square trinomial, and add it to both sides of the equation:

$$x^2 - 8x + \_\_\_\_ = -1 + \_\_\_\_$$

Solution: $x^2 - 8x + 16 = -1 + 16$

b. Rewrite equation by factoring the perfect square trinomial on the LHS, and simplify the RHS by adding the numbers:

Solution: $(x - 4)^2 = 15$

c. Now take the square root of both sides, remembering the square root property (i.e., there are two square roots to consider on the RHS, the positive and the negative!):

Solution: $x - 4 = \pm\sqrt{15}$

d. Finally, solve for x:

Solution: $x = 4 \pm \sqrt{15}$

You should have the same solutions in #2 and #3(d)!