Name: _____

MATH 101
Fall 2023
HW 16: Due 12/11

"I hope that seeing the excitement of solving this problem will make mathematicians realize that there are lots and lots of other problems in mathematics which are going to be just as challenging in the future."
–Andrew Wiles

Problem 1. (10pt) Without explicitly solving the quadratic equation, determine whether how many distinct solutions the equation has and whether the solutions are rational, real, or complex. Be sure to justify your answer.

$$4x(5-x) = 11$$

Problem 2. (10pt) Without explicitly factoring the function $f(x) = x^2 - 2x + 26$ factors 'nicely' over the integers, reals, or complex numbers. Be sure to justify your answer.

Problem 3. (10pt) Solve the following quadratic equation. Be sure to fully justify your answer and show all your work. Verify your answer(s).

$$2x^2 = 3 - 5x$$

Problem 4. (10pt) Solve the following equation. Be sure to fully justify your answer and show all your work.

$$x = \frac{10x - 19}{x}$$