Math 105 - Homework 7 **Name:** _____

The following problems are organized by the concepts they use. You should try to solve each problem without any outside help (no computers, calculators, etc.).

Factoring

Know the two kinds of factoring: factoring out **common factors** and factoring **quadratic polynomials**.
Simplify the following expressions as much as possible by factoring.

1. $x^2 - 7x + 10$
2. $x^2(x-5) - 4(x-5)$

Fraction Operations

Understand how to add, subtract, multiply, and divide fractions.
Simplify each of the following to a single reduced fraction

3. $\dfrac{4}{x-3} - \dfrac{7}{x(x-3)}$
4. $\dfrac{\dfrac{1}{x+h} - \dfrac{1}{x-h}}{\dfrac{h}{2}}$

Cancellation Rules

You can cancel **common factors** in fractions, but not terms!
Simplify as much as possible.

5. $\dfrac{x^2 - 2x + 1}{x^2 + 3x - 4}$
6. $\dfrac{6x^4}{x^4 + x^2}$

Distribution, FOIL, and Order of Operations

Use distribution and the FOIL method to expand products of factors into sums of terms.
Know the correct order of operations (PEMDAS or GEMS).
Expand the following expressions.

7. $2 + x(x-3)(2x+1)$
8. $y + 2(y - 4(x-1))$

Solving Polynomial and Rational Equations

Solve polynomial equations by moving every term to one side and factoring.
A fraction is only zero when the top is.
Find all solutions to the following equations.

9. $6x = x^2 + 8$

10. $\dfrac{x^3 + 6x^2 + 5x}{x - 1} = 0$

Solving Simple (Non-Polynomial) Equations

You can do anything you want, as long as you do it to both sides.
Solve each of the following equations for x.

11. $5 = \dfrac{30}{x - 4}$

12. $5y = \dfrac{30}{x - 4}$

Functions and Graphs

Understand function notation and how graphs relate to functions.
Understand linear functions and slope.
Graph the following functions. Label the points where they cross the x and y-axes.

13. $f(x) = \dfrac{x^2 - 4x - 5}{5}$

14. $g(x) = -\frac{1}{2}(x - 2) + 1$

15. Use the graph below to find the values of x for which $f(x) > -3$.