HOMEWORK 4 - MATH 140

DUE DATE: Monday, September 26
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. One part of each homework problem will be chosen at random and graded. Each question is worth 1 point. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Solve the following radical equations:
   (a) $\sqrt{3-x+x^2} = x-2$
   (b) $\sqrt{3x-5} - \sqrt{x+7} = 2$
   (c) $\sqrt[5]{4-7x} - 2 = 0$
2. Solve the following absolute value equations:
   (a) $|x^2+x| = 12$
   (b) $|x^2+3x-2| = 2$
3. Solve the following absolute value inequalities:
   (a) $|1-2x| - 4 < -1$
   (b) $|3x+5| \geq 12$
4. Find the domain and sketch the graph of each of the following piece wise defined functions:

$$f(x) = \begin{cases} x+3, & \text{if } x < 2 \\ -2x-3, & \text{if } x \geq 2 \end{cases} \quad \text{and} \quad g(x) = \begin{cases} \frac{1}{x}, & \text{if } x < 0 \\ \sqrt{x}, & \text{if } x > 0 \end{cases}$$

5. Find the equation of the function whose graph that is depicted below:

6. What is the equation of the graph that results from
   (a) shifting the graph of $y = x^3$ three units to the right and then reflecting it with respect to the x-axis.
   (b) compressing the graph of $y = x^2$ by a factor of 2 and then shifting it 5 points downward.
7. Use transformations to sketch the graph of the function $g(x) = \sqrt{x-2}+3$ starting from the graph of $f(x) = \sqrt{x}$.
8. Use transformations to sketch the graph of $g(x) = (3-x)^3 + 2$ starting from the graph of the function $f(x) = x^3$.