HOMEWORK 2 - MATH 160
DUE DATE: Tuesday, September 8
INSTRUCTOR: George Voutsadakis

Read each problem **very carefully** before starting to solve it. Two out of the ten problems will be chosen at random and graded for a total of 20 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find an equation for the straight line that passes through the point $(-1, 3)$ and is perpendicular to the line with equation $3x + 4y - 8 = 0$.

2. Find an equation for the line that passes through $(-3, -2)$ and is parallel to the line passing through $(-2, -4)$ and $(1, 5)$.

3. Find the domain of the function $f(x) = \sqrt{2x - 9}$. How about the domain of $g(x) = \frac{1}{\sqrt{2x-9}}$?

4. Find the domain of the function $f(x) = \frac{2x-3}{3x^2-5x-2}$.

5. Sketch (nicely) the graph of the function $f(x) = \begin{cases} x + 2, & \text{if } x \leq -1 \\ -x^2 + 1, & \text{if } x > -1 \end{cases}$

6. Let $f(x) = \frac{1}{x}$ and $g(x) = 2x + 3$. Find $f(x)g(x)$, $\frac{f(x)}{g(x)}$, $f(g(x))$ and $g(f(x))$.

7. If $f(x) = x - 3$ and $g(x) = \frac{1}{\sqrt{x+1}}$, find rules for the composite functions $f \circ g$ and $g \circ f$.

8. Find two functions f and g, such that $h = g \circ f$, where $h(x) = \frac{1}{(2x^2+x+1)^3}$.
   (Hint: This problem has more than one solutions.)

9. Find the value of c, so that the point $(4, 2)$ lies on the graph of the function $f(x) = cx^2 + 3x - 4$.

10. No tenth problem this week!