Homework 4: Due Friday February 24th recitation. Late homework will not be accepted.

Write on only one side of each page. Staple all work.

1. My friend earns more 30 % more than me. Together we make \$39, 348 per year. What is my annual salary? Round to the nearest dollar.

2. I would like to figure out the dimensions of our classroom. I am simply concerned with the dimensions of the floor, which we assume is a rectangle and has area 450 ft^2. Moreover, assume that the length is 10 ft longer than the width. Find the dimensions. Round to the nearest foot.

3. Determine the values of x for which the expression $\sqrt{2x^2+3x-2}$ is a real number.

4. Solve the inequality for x

$$\left|\frac{bx+c}{a}\right| > 5a.$$

Assume that a, b, c are positive constants.

5. In my spare time I like to sell math books. The books that I sell are not obtained for free unfortunately, I buy them in lots of 100. I pay C dollars where $C = 2000+8x+.00025x^2$. Here x is number of lots purchased. For every lot I sell, I generate a revenue of R dollars where $R = 20x$.

(a) How many lots should I sell to see a profit of at least \$2400.

(b) Interpret the slope of the revenue R.

6. When we say y is directly proportional to x, we write $y = kx$ where k is some constant. Suppose we have a spring and we stretch it a distance of x beyond its natural length. Hooke's law says that the force required to hold the spring x units beyond its natural length is directly proportional to x.

(a) A force of $40N$ is required to hold a spring that has been stretched from its natural length of $10cm$ to $15cm$. Denote the force by y. Find an equation for y.

(b) Find the force needed to hold a spring from its natural length to 18cm.

7. Find the domain of $f(x)$ where

(a) $f(x) = \frac{1}{x^{18}-8}$.

(b) $f(x) = \frac{1}{\sqrt{x^6-1}}$.