WEEKLY 1
APPLIED CALCULUS
DUE 2012-08-27

Show your work!

(1) For each line below, find its slope, its y-intercept, and its equation (in any form).
   (a) The line through $(1/2, 3)$ and $(3, 4)$.
   (b) The line through $(1/2, 3)$ and (c, d).
   (c) The line through (a, b) and (c, d).

(2) When Galileo was formulating the laws of motion, he considered the motion of a body starting from rest and falling under gravity. He originally thought that the velocity of a falling body was proportional to the distance it had fallen. What do the experimental data in the table below tell you about Galileo's hypothesis?

Distance (in ft)	0	1	2	3	4
Velocity (in ft/sec)	0	8	11.3	13.9	16

What alternative hypothesis is suggested by the chart above, and the additional data below?

Time (in sec)	0	1	2	3	4
Velocity (in ft/sec)	0	32	64	96	128

Give as detailed an answer as possible, in complete English sentences.

(3) (a) Find the equation (in any form) of the line through the points (a, a^2) and (b, b^2).
   (b) Graph the lines above, on the same set of axes, when $a = 2$ and $b = 3$, then when $b = 2.5$, then when $b = 2.25$. Make a hypothesis about what happens as b gets close to $a = 2$.

(4) (#14, p. 104, of *Preparation ...*) A rectangular enclosure is to be divided into three equal sections by two dividers. 640 ft of fencing is provided for the project. Write a function of one variable that gives the enclosed area, and determine its domain.

(5) (#5, p. 105, of *Preparation ...*) An office supply store has determined that the demand function for an ergonomic mouse is given by $p = 30 - q$, while the related producer supply function is given by $p = \sqrt{q}$, where q is the quantity demanded weekly, and p is the price per unit in dollars. Determine the equilibrium point. Round quantities to the nearest dollar, and unit prices to the nearest cent. Keep in mind that both price and quantity must be positive!

(6) **One** book problem (*Mathematics with applications*, p. 686): #11.3.9.