MTE 483 Oehrtman
Spring 2008

Homework 9
Due Tuesday, March 25

"Mathematics is like checkers in being suitable for the young, not too difficult, amusing, and without peril to the state."
– Plato

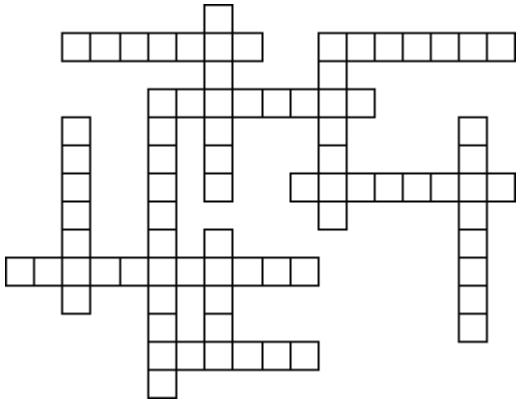
1. Chort and Frey ran a marathon (26.2 miles). Chort ran at a perfectly uniform pace of eight-minutes-per-mile. Frey took exactly eight minutes and one second to complete each one-mile interval. This refers to all one-mile intervals, including, for example, the interval from 5.63 miles to 6.63 miles. Nevertheless, Frey finished ahead of Chort. Explain how.

2. Frey was painting the outside of his house standing on top of a 10-foot ladder leaning against the wall. When Chort wandered by, he decided to play a prank on Frey and slowly started to pull the base of the ladder away from the wall at a constant rate of one inch per second. While trying to remain balanced on top of the ladder, did Frey fall at a constant rate, faster, or slower as Chort pulled on the base? Complete an extended analysis of this problem using at least one of the techniques listed on the class website.

3. Find a simple way to solve the following system of equations:
$$\frac{xy}{x+y}=\frac{1}{2} \qquad \frac{xz}{x+z}=-\frac{1}{3} \qquad \frac{yz}{y+z}=\frac{1}{7}$$

4. A woman is playing fetch with her dog on the beach. Her dog can run 15 ft/s and can swim 5 ft/s. Suppose the ball is thrown into the water at a point 15 ft straight out from the location that is 20 ft down the beach. To what point on the beach should the dog run before swimming to the ball in order to retrieve it in the shortest time. How much time will this take? Complete an extended analysis of this problem using at least one of the techniques listed on the class website.

Free Bonus Problem*: Below is a self-enumerating puzzle with a unique solution. Each of the six horizontal and six vertical entries is of the form "THIRTEEN NS." Here "THIRTEEN" can be any possible English number-word and "N" can be any letter in English. The idea is that if "THIRTEEN NS" is one of the entries, then the completed puzzle does indeed have exactly 13 instances of the letter "N." There are 12 entries, and so there will only be 12 different letters used in the completed puzzle. Every entry will have one blank cell, and an "S" occurs at the end when a plural necessitates it.



* Completion of this puzzle, partial progress, or any other evidence of mental energy expended on it is worth no credit for this class.