MATH 121 Section 02 Homework 5

Below is a list of selected problems from Stewart's <u>Calculus</u>. The first problems are suggested exercises and you do not need to turn them in. The latter set of four problems you should write up carefully and neatly as they will be graded. It is in your best interest to work all of the problems. All problems from the homework are fair game on the exams! You are encouraged to work in groups, but you must write up your own solutions. The required problems are due Friday March 16, 2007. Please ask me questions if you have any.

1 Suggested Problems

- §3.9) 1-19 odd
- §3.10) 5, 7, 9, 15 35 odd, 39, 41, 43
- §4.1) 1-55 odd
- $\{4.2\}$ 1,3, 7, 11, 13, 15, 17, 19, 23, 25

2 Required Problems

- 1) Two zombies start lumbering away from the same point. One walks east at 1 mi/hr and the other limps northeast at 0.5 mi/hr. How fast is the distance between the zombies changing after 15 minutes?
- 2) Use differentials to estimate the amount of paint needed to apply a coat of paint 0.05 cm thick to a hemispherical dome with diameter 50 m. Now imagine that the paint is solid gold, and you have to pay for it. See the capital building for details...
- 3) An object with weight W is dragged along a horizontal plane by a force acting along a rope attached to the object. If the rope makes an angle θ with the plane, then the magnitude of the force is

$$F = \frac{\mu W}{\mu \sin\left(\theta\right) + \cos\left(\theta\right)}$$

where μ is a positive constant called the *coefficient of friction* and where $0 \le \theta \le \pi/2$. Show that F is minimized when $\tan(\theta) = \mu$.

4) A number a is called a **fixed point** of a function f if f(a) = a. Prove that if $f'(x) \neq 1$ for all real numbers x, then f has at most one fixed point.