MATH 121 Section 02 Homework 4

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 2, 2007. Please ask me questions if you have any.

1 Suggested Problems

- §3.4) 1-15 odd
- §3.5) 1-23 odd, 33, 35, 37, 39, 41
- §3.6) 1-41 odd, 45, 53
- $\S{3.7})$ 1-25 odd

2 Required Problems

1) A semicircle with diameter PQ sits on an isosceles triangle PQR to form a region shaped like an ice-cream cone, as shown in the figure. If $A(\theta)$ is the area of the semicircle and $B(\theta)$ is the area of the triangle, find



- 2) Suppose f is differentiable on \mathbb{R} and suppose α is any fixed real number. Let $F(x) = f(x^{\alpha})$ and $G(x) = [f(x)]^{\alpha}$. Find expressions for F'(x) and G'(x).
- 3) Write $|x| = \sqrt{x^2}$ and use the chain rule to show that

$$\frac{d}{dx}|x| = \frac{x}{|x|}.$$

If $f(x) = |\sin(x)|$, find f'(x) and sketch the graphs of f and f'. Where is f not differentiable?

4) Find equation of the tangent line to the ellipse $x^2/a^2 + y^2/b^2 = 1$ at the point (x_0, y_0) on the ellipse.