MATH 122 Section 01
Homework 4

Below is a list of selected problems from Stewart's <u>Calculus</u> as well as some others that are required. The required problems will be due Friday March 2, 2007. You do not need to turn in the suggested exercises, but 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. I will be available during office hours for help.

1 Suggested Problems

§7.6) 1-11 odd, 15, 19, 21, 29, 31-43 odd, 53-61 odd

§7.7) 1- 33 odd, 41, 43, 51, 55

§8.1) 1-23 odd, 27-31 odd, 45

§8.2) 1-31 odd, 59, 61

2 Required Problems

(1) If f' is continuous, $f(2) = 0$, and $f'(2) = 7$, evaluate

$$\lim_{x \to 0} \frac{f(2 + 3x) + f(2 + 5x)}{x}$$

(2) If $f(0) = g(0) = 0$ and f'' and g'' are continuous, show that

$$\int_0^a f(x)g''(x)dx = f(a)g'(a) - f'(a)g(a) + \int_0^a f''(x)g(x)dx.$$

(3) Prove that, for even powers of sine,

$$\int_0^{\pi/2} \sin^{2n}(x)dx = \frac{1 \cdot 3 \cdot 5 \cdot \cdots \cdot (2n-1)}{2 \cdot 4 \cdot 6 \cdot \cdots \cdot 2n} \frac{\pi}{2}$$

(4) A particle moves on a straight line with velocity function $v(t) = \sin(\omega t)\cos^2(\omega t)$. Find its position function $s = f(t)$ if $f(0) = 0$.

(5) Find the volume obtained by rotating the region bounded by the given curves about the specified axis.

$$y = \cos(x), \ y = 0, \ x = 0, \ x = \pi/2; \text{ about } y = 1.$$