

MATH 122 Section 01
Homework 2

Below is a list of selected problems from Stewart's Calculus. You will have until Friday March 16 to finish the problem set. The first problems are suggested exercises and you do not need to turn them in. The latter set 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. I will be available during office hours for help.

1 Suggested Problems

§8.3) 1-21 odd

§8.4) 1-7 odd, 15, 19, 21, 31, 39

§8.7) 1, 5, 7, 9, 17, 21

2 Required Problems

- 1) A torus is generated by rotating the circle $x^2 + (y - R)^2 = r^2$ about the x -axis. Find the volume enclosed by the torus.
- 2) Show that if f is a polynomial of degree 3 or lower, then Simpson's Rule gives the exact value of $\int_a^b f(x)dx$.
- 3) A charged rod of length L produces an electric field at point $P = (a, b)$ given by

$$E(P) = \int_{-a}^{L-a} \frac{\lambda b}{4\pi\epsilon_0(x^2 + b^2)^{3/2}} dx$$

where λ is the charge density per unit length on the rod and ϵ_0 is the free space permittivity. Evaluate the integral to determine an expression for the electric field $E(P)$.

- 4) Use Simpson's Rule with $n = 8$ to approximate $\int_2^{10} x^4$. What is the error? Try again with $n = 16$ and recompute the error.