REVIEW SUGGESTIONS FOR THE FIRST EXAMINATION

The exam will cover material in Chapters 7 and 8 of the text, including (1) finding antiderivatives (indefinite integrals), (2) the Fundamental Theorem of Calculus relating definite integrals, antiderivatives and limits of Riemann sums, (3) change of variables methods for finding antiderivatives, (4) basic properties of definite and indefinite integrals like additivity, pulling out constants and (for definite integrals) $f \le g \Longrightarrow \int_a^b f(x)dx \le \int_a^b g(x)dx$ plus the identity $\int_a^b = \int_a^c + \int_c^b$, (5) using integrals to find the area between two curves — often one key step is to find where two curves intersect, (6) problems involving velocity, acceleration and distance traveled — the latter often requires integrating the absolute value of a function and splitting the integral into pieces as in (4) above, (7) volumes of solids of revolution by the disk and shell (or washer) methods, (8) average values of functions over integrals, (9) using integrals to compute work or equivalently energy usage — often a key issue here is to find the function which gives the necessary force at a given time or place.

Here are a couple of problems that were considered but not put on the exam. The exam itself may contain problems close to some or all of these.

1. Compute $\int_0^2 |x^3 - x|\, dx$.
2. Find the area of the half doughnut shaped solid formed by revolving the region between the x-axis and the parabola $y = 1 - (x-2)^2$ about the y-axis. Use the shell method.
3. Find the average value of the function $\sin x$ over the interval $\pi/4 \le x \le \pi/2$.

Some problems in the online notes that are particularly worth reviewing are the work problems in `notes0805.pdf`, the integrals of absolute values of linear functions in `notes0802.pdf` and `notes0804.pdf`, and the area integrals in `notes0801.pdf`.

There will be four problems on the examination and they will all be very uniform in terms of level and point value.