Review for First Exam

The first exam will cover sections 4.9, 5.1, 5.2, 5.3, 5.4, 5.5, 6.1, and 6.2 of the text.

For this exam you should know the definition of "Riemann sum" and "definite integral". These definitions are in the box on page 300 (the Riemann sum in this definition is the sum that comes after the limit sign in the displayed equation — see note 3 on page 301.)

Here is a list of which parts of these sections are covered on the exam, and which you can skip.

4.9 We covered this whole section. Actually, I didn't cover the material from the section at the end titled "Rectilinear motion", and there won't be problems on the exam like those in Examples 6 and 7 — but I'm sure you know this material already from your previous calculus course.

5.1 We covered this whole section. There will not, however, be a problem like Example 2 on the exam.

5.2 You should review the whole section, except that you can skip Examples 2(b) and 3(b), and the section titled "The Midpoint Rule" on p. 306. Also, you won't need to know the formulas numbered 5 through 11 on p. 303.

5.3 Review the whole section carefully! If you are wondering whether there will be any questions concerning the *proof* of the Fundamental Theorem of Calculus, the answer is no. It will, of course, help you better make sense of the course material if you understand these proofs; and material that makes more sense is easier to learn.

5.4 In this section, we only covered the first three pages (pages 324 through 326). You can skip the rest of the section.

5.5 We covered the entire section. Integration by substitution is perhaps the most important technique of integration, and you can expect a good number of problems in which you have to use it, not only in this section but in sections 6.1 and 6.2 as well.

6.1 We covered the entire section, except you can skip Examples 3 and 4.

6.2 In class, we derived the formula

$$V = \int_a^b \pi y^2 \ dx$$

for the volume of a solid of revolution obtained by revolving around the x-axis the region between $y = f(x)$, $y = 0$, $x = a$, and $x = b$. The formula was derived by

obtaining the desired volume as the limit of a sum of volumes of thin disks. We then went on to explain how to obtain similar formulas for other types of volumes of revolution.

The textbook takes a slightly different approach: it starts by deriving a general formula for the volumes of solids which are not necessarily solids of revolution, and then obtaining the formula for volumes of solids of revolution as a special case.

Strictly speaking, if you understood the derivation given in class, you need only read Examples 1 through 6 of this section to prepare for the exam. You can skip the material on pages 354 and 355, as well as Examples 7, 8, and 9. However, I think the material on pages 354 and 355 is well worth reading, to improve your understanding of the material in the rest of the section. As for examples 7, 8, and 9; no need to worry about them for now — we may come back and discuss them later, after the first exam.