Math 242

Notes for Chapter 6.1

How to Study:
Emphasize HW problems and keeping up with the class. Make plans to do assignments *every day* so you can get help *before* the next class when we move on to the next thing! Set aside a specific time - if you can make time for a sit-com at 8:00, you can make time to start HW.
Keep track of problems you had trouble with in the HW. Try to do these again (even though you did them once with help) and practice them before the next quiz. Keep a list of quiz problems as well and practice these along with the HW problems that you had trouble with (or think are good test questions) and practice these throughout the weeks leading up to a test. Repeat this again, keeping test questions and use them to help you study for the final.

Announce: Solutions manual and other books on reserve.

Discuss:
6.1: 63, 64, 66, 67, 69, 70, 71
6.2: 69, 70, 74
6.3: 27, 28
6.4: 25 - 27, 29
6.5: 95 - 97, 103, 104

I. Overview of chapter 6: The Integral and The Anti-derivative

Since antiquity there has been the question of finding the area bounded by curves. In particular, the area under the curve of a function. This is the central theme of the semester. Together with the question of instantaneous rate of change, this makes up the essence of calculus. Strangely, the two concepts are related through the Fundamental Theorem of Calculus and algebraically through the antiderivative. Traditionally calculus books introduce the mechanics first and then the concepts and this book is no exception (so to keep the HW sets uncomplicated, we'll follow the book).

A. Have students answer the question: If $f'(x) = x^2$, then $f(x) =$
Ask them to take the following derivatives:

$\frac{d}{dx}x^7$ $\quad\frac{d}{dx}x^7 + 3$ $\quad\frac{d}{dx}x^7 - 12$ $\quad\frac{d}{dx}x^7 + \pi$

Then discuss what this implies about $f(x)$ above.

Follow with laundry list of derivative properties (if we're finding anti-derivatives, then we want to know what the derivatives are in the first place).

B. Applications.

We saw that Cost –> MC (and R –> MR) so it makes sense that the antiderivative of MC is C:
Marginal Cost –> Cost

So at least naively you would look at MC = $C'(q) = .06q^2 - .13q + 5$ and say $C(q) = .02q^3 - .065q^2 + 5q$ but then you'd be forgetting that $C(q) = .02q^3 - .065q^2 + 5q + 1000$ also satisfies the requirement. In fact, $C(q) = .02q^3 - .065q^2 + 5q + k$ works for any real number k. But let's think about that number, k. Notice that $C(0) = k$ so when production is down to nothing it's costing us k dollars to operate - what does this tell us about k? Fixed Cost!. So let's write a problem . . .

*The book uses the phrase, "evaluate these integrals," when really they mean, "find these anti-derivatives." Be aware of this.