The First Group Project

This is due in class Monday February 5. This is due in class Tuesday October 24. You are to work in your present groups that were assigned the last time we handed out the playing cards. These groups should not be any larger than 4 persons and preferable of size 4 exactly. Each group will turn in one paper with all your names on it. To try to insure that everyone odes their share of the work each name should have a percentage after it that represents the percentage of the work that the group as a whole felt that each person did. Thus if the people in the group are A, B, C, and D and everyone put about the same amount of work into the project, then everyone would be rated 25%. If however person A put in a lot of effort and person C only only did a little bit the numbers might look like A 40%, B 25%, C 10% D 25%. As long as all the numbers are above 10 % this will not effect the grade, but anyone who does less than 10 % will be penalized.

You are being given the project a week and a half before it is due, which gives you a long enough period to find a couple of times where you can all meet. One good time and place for this is Fridays in our regular class room at the regular class time. As usual I am willing to answer all reasonable questions relating to the project and help with any computer problems that come up.

Important note: ***All projects are to be hand written.*** During the several terms I have had several groups spend more time on trying to get the word processing to look pretty than what is way to say what they mean. This means that I want the project to be well written. About the best way to insure this is to rewrite it several times.

The Problem: Computing Volumes by Riemann Sums and Integrals

Read Pages 324–327 in the text.

1. Do Problem 13 on Page 326 of the text. Write up the solution so as it will be readable by the patient of whose liver you have taken the CAT scan.

2. Let $y = f(x)$ be defined on the interval $a \le x \le b$ and assume that $f(x) > 0$ on this interval. Let D be the three dimensional region formed by revolving this curve about the x-axis.

   (a) Draw a picture of this region.

   (b) By the method used in Pages 324–327 of the text give a a detailed and convincing argument, using Riemann sums, that

   $$\text{Volume of the region } D = \pi \int_a^b f(x)^2\,dx.$$

   (In explaining this it should be useful to include pictures.)

   (c) Let $f(x) = \frac{1}{8}x(10 - x)$ be defined on $0 \le x \le 10$. Find the volume when this region is revolved about the x-axis. (This region should look like a rather pointed football. Draw a picture.)