

WORKSHEET FOR 1/23/2009

Reading assignment for Monday: Read the rest of chapter 5, though only skim section 5.5. This is a lot of reading, but it should all be review from calculus I. Future reading assignments will be shorter.

Homework due Monday: 5.1: 67, 72. **5.2:** 3, 4, 59 (f is defined in the instructions just before problem 57). **5.3:** 31(a), 45, 53. Send me an email if you get stuck:

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Announcements: The website is up, including solutions to Wednesday's lab exercise.

Instructions: Do the following problems in order. Help your group members, and ask your group members questions if you have them. If your *group* is a little stuck, raise your hand. When your group is done, you should staple your own paper and write your name on it. Then paperclip all the papers from your group together. Finally, write all the group members' names on the first page.

- (1) Suppose that $\int_0^x f(t) = 3x^2 + e^x - \cos x$. Find $f(2)$.
- (2) A valve is opened, and water starts flowing through a pipe at time $t = 0$. Suppose that $f(t)$ gallons/second of water are flowing through a pipe for any time $t \geq 0$. Write down an expression for the amount of water that flows through the pipe in its first 30 seconds of operation.
- (3) Let $F(x) = \int_0^x (\cos t)^2 e^t dt$.
 - (a) Find the critical numbers of F .
 - (b) Where is F concave up and concave down? Find local maxima and minima on the interval $[-1, 2\pi]$?
 - (c) Find the where F achieves its maximum and minimum values on the interval $[-1, 2\pi]$.
- (4) Show that $0 \leq \int_0^\pi \sin^2 x dx \leq \pi$. *Hint.* You will not be able to compute the actual area. Draw a graph and think about the area.
- (5) Evaluate $\int_0^{2\pi} |\sin x| dx$.
- (6) Evaluate $\int_{-1}^1 \sqrt{1-x^2} dx$. *Hint.* You will probably not be able to find an antiderivative. What shape is this describing?