Calculus II PLTL

Fall 2014

Worksheet 2

These problems are to be done without the use of a calculator unless otherwise specified.

(Small Groups) Talk about how you have been studying for the first exam. What types of questions do you think will be on the exam? How much practice do you think is necessary to do well? Do you have a tried-and-true study method that you would like to share with the group? Do you study alone? In groups? Do you visit the professor's office hours? Walk-in help? Review sessions? What will you do if you need help with something?

1) *(Pairs)* Sketch each region on the board without using a graphing calculator and use an integral to compute the area of the region.

(a) The region between the curves $y = e^x$ and $y = e^{-x}$ and the lines $x = 0$ and $x = 1$.

(b) The region between $y = \sin x$ and $y = 1$ for $\frac{\pi}{2} \leq x \leq \frac{3\pi}{2}$.

(c) The region between $y^2 = 2(x - 3)$ and $y^2 = x$.

2) *(Round Robin)* Let $f(x) = x^3$ and let R be the region between the graph of f and the x-axis on $[0, 2]$. (Fun fact: A region such as R is called a *cubical spandrel*.)

(a) Use the shell method to find the volume of the solid obtained by revolving R about the y-axis.

(b) Check your answer using the washer method.

3) Find the length of the curve $y = \frac{1}{12}x^3 + \frac{1}{x}$ for $1 \leq x \leq 3$.

4) *(Pairs)* Find the volume of the solid whose base is the region in the xy-plane bounded by the circle $x^2 + y^2 = 900$ and whose cross-sections perpendicular to the y axis are semicircles.

5) *(Scribe)* Let $y = \int_1^{x^3} \sqrt[3]{t}\, dt$. Find the value of $\frac{dy}{dx}$ at $x = 2$.