Math 1XX3 Winter 2013 Maple Lab 1

Instructions This lab is about using the mathematical software package Maple to do integral calculations for you. Read through Sections 7.1, 7.2, and 6.4 of the CalcLab manual, as well as the handout given by Dr Lovric last semester. Also review how to define functions in Maple. Then do the following problems. You should hand in a Maple worksheet (with your name on it) that includes your commands and the solutions to the problems (*clearly indicate* where to find the solutions). Clean up the worksheet so that any mistakes you made in the process are eliminated from view.

1) Consider the following two functions.

$$f(x) = (x+3)^3 + 10(x+2.5)^2 - 43 \text{ and } g(x) = \frac{1}{8}x^2 \ .$$

Enter the above two functions into Maple, and verify that $f(10) = 3716.5$ and $g(10) = 12.5$. (This step is just to make sure that you entered the functions correctly.)

Find the area of the region enclosed between the graphs of these two functions.

2) Consider the following two functions.

$$h(x) = \sin^2(5x) + e^x \text{ and } k(x) = 15 + 55\ln(x) \ .$$

Enter the above functions into Maple, and verify that $h(3) = 20.508411$ and $k(3) = 75.423676$.

Find the volume of the solid obtained by rotating the region bounded by the graphs of $h(x)$ and $k(x)$ about the x-axis.

3) Use the `VolumeOfRevolution` command to display a graph of the solid obtained by rotating the region bounded by the functions $f(x) = \sin(x)$ and $g(x) = \cos(x)$ on the interval $[0, \pi/4]$ about the x-axis.

4) Use Maple to evaluate the following integral.

$$\int x^2 \ln(x + \sqrt{9+x^2})\, dx.$$

First try the `value` command by itself. Maple gives up. Now use the `Parts` command with $u = \ln(x + \sqrt{9+x^2})$, followed by `value` in order to evaluate the integral.