Math 1120 Homework Assignment 3

Due week of February 16

You should do the problems from the book first and check your answers to be sure you understand the methods. You are responsible to do all problems. Hand-in starred problems only.

Book problems:

Section 6.1: 3, 5, 11, 19, 23, 39, 41, 51a
Section 6.2: 4*, 7, 8, 9, 11, 12*, 15, 19, 21, 23b, 26*
Section 6.3: 2*, 3, 4*, 5, 7, 9, 10*, 11, 13
Section 6.4: 4*, 20*, 28*

Other problems:

A* Find the volume of the solid whose base is the region between the $x$-axis and the parabola $y = 9 - x^2$ and whose cross-sections are squares perpendicular to the $x$-axis between the $x$-axis and the parabola.

B Find the volume obtained by rotating the region bounded by $y = x^4$ and $y = 1$ for $0 \leq x \leq 2$ about the $x$-axis.

C* Find the volume obtained by rotating the region bounded by $x = \sin y$, $y = 0$, $x = 1$ about the $y$-axis.
D Find the volume of the solid obtained by rotating the region bounded below by $x = 2y - y^2$ and above by $y = x$, about the $x = 1$.

E* Using (a) the shell method and (b) the washer method, write definite integrals that represent the volume obtained by rotating the region bounded by $y = x^2$ and $y = x^3$ about the $y$-axis. Evaluate the integral that seems simpler to you.

F* Set up but do not evaluate an integral for the length of the curve $x = y + y^3$ for $0 \leq y \leq 4$.

G Find the area of the surface generated by revolving the curve $y = \sqrt{x + 3}$, $2 \leq x \leq 4$ about the $x$-axis.

H* Find the area of the surface generated by revolving the curve $9y = x^2 + 18$, $2 \leq y \leq 6$ about the $y$-axis.

I* Find the area of the surface generated by revolving the graph of the astroid

$$x^{2/3} + y^{2/3} = 1$$

around the $x$-axis. You can see a picture of this curve in Figure 11.15 in the text. (You may ignore the equations given there.)