Math 215
Homework Set 5: §§15.8 – 16.3
Winter 2008

Most of the following problems are modified versions of homework problems from your text book *Multivariable Calculus* by James Stewart.

15.8a. Find the extreme values for the function $2y^2 + 3x^2 - 4y - 3$ on the set $\{(x, y) \mid x^2 + y^2 \leq 25\}$.

15.8b. Do Problem 65 on page 983 of Stewart's *Multivariable Calculus*.

16.1a. The integral

$$\int_D \sqrt{25 - x^2}\, dA$$

with $D = [1, 3] \times [-1, 4]$ represents the volume of a solid. Sketch the solid.

16.1b. Sketch the solid whose volume is given be the iterated integral

$$\int_1^2 \int_{-1}^3 (15 - 3x - 2y)\, dx\, dy.$$

16.2a. Find the volume of the bounded region in the first octant bounded by the surface $z = 1 + (x-3)^2 + 3y^2$ and the planes $x = 4$ and $y = 2$.

16.3a. In evaluating a double integral over a region D, a sum of iterated integrals was obtained as follows:

$$\int_D f(x, y)\, dA = \int_{-2}^0 \int_{-2}^x f(x, y) dy\, dx + \int_0^4 \int_{-2}^{-\sqrt{x}} f(x, y) dy\, dx.$$

Sketch the region and express the double integral as an iterated integral with reversed order of integration.

16.3b. Do Problems 46–50 of §16.3 in Stewart's *Multivariable Calculus*.