MATH 114 ASSIGNMENT 6, FALL 2015

Due in class on Friday, October 16

Part 1. Read Thomas 14.8, 15.1, and also 14.9 on Taylor expansions.

Part 2. Do and write up the following problems, from Thomas and old final exams.

14.8 Exercises 26, 42, 44

15.1 Exercises 32, 34.

[Note that in problem 34, the region of integration is $\{(x,y) : 0 \le x \le 3,\ 0 \le y \le 1\}$; the convention is that dx is closest to the integrand xe^{xy}, so it is understood that the integral with respect to dx is performed first, over the interval $[0,3]$.]

S11 Math 114 Final Exam, Spring 2011, problem 7

S12 Math 114 Final Exam, May 4, 2012, problem 10

F12 Math 114 Final Exam, Fall 2012, problem 11

S13 Math 114 Final Exam, Spring 2013, problem 8

F13 Math 114 Final Exam, December 17, 2013, problems 6, 8

S14 Math 114 Final Exam, May 5, 2014, problem 4

Part 3. Extra credit problem.

Show that the the function $f(x,y,z) = xyz$ on the *unbounded* surface

$$S := \{(x,y,z) : x,y,z \ge 0,\ xy + yz + zx = 5\}$$

has a maximum, and evaluate this maximum.

Note: ou need to show that the function $f(x,y,z) = xyz$ indeed has a maximum on the unbounded surface S. Because the surface S is unbounded, the existence of a maximum is not automatic. For instance it does not have a maximum on the surface

$$S := \{(x,y,z) : x,y,z \ge 0,\ x^2 - y^2 - z^2 = 1\}.$$