

Math 53 Homework 4

Due Wednesday 10/2/13 in section

(The problems in parentheses are for extra practice and optional. Only turn in the underlined problems.)

Monday 9/23 – Functions of several variables

• **Read:** sections 14.1; also 12.6 to the bottom of p. 830¹; and 14.2 (skip the theory, focus on examples 1–3, the definition of continuity, examples 7–8).

• **Work:** Problem 1 below.

14.1: (13), (25), (32), 36, (39), (43), 59, (61), 66, (70), (78).²

14.2: (4), (7), 9, 13, (27), (33), 39, (43).³

Wednesday 9/25 – Partial derivatives, tangent plane, linear approximation

• **Read:** section 14.3 to bottom of p. 909.⁴

• **Work:** 14.3: (5), 10, (11), 24, (37), (41), 42, 47, (51), 53, (61), 77, 79, 88, 93.⁵

Friday 9/27 – Tangent plane, linear approximation

• **Read:** section 14.4[†].

† WARNING: *Please don't mix differentials like dz with differences like Δx or Δy . Differentials don't take a numerical value, and " $dx = \Delta x$ " does not make mathematical sense. See lecture.*

• **Work:** 14.4: (1), 3, 17, (19), 21, (25), 28, 33[†], 38[†], (39).

† *Whenever the book says "use differentials to estimate ...", read "use linear approximation to estimate ...".*

Problem 1.

a) Sketch the graph of the function $f(x, y) = 3 - x^2 - y^2$.

b) Sketch the graph of the function $g(x, y) = \sqrt{x^2 + y^2}$.

c) Make a rough sketch of a contour plot for the function whose graph is depicted in Figure 10(a) on page 882 [6th ed: p. 860].

d) Draw a contour plot of the function $f(x, y) = e^{y/x}$ showing several level curves.

¹6th ed: to bottom of p. 808

²6th ed: 14.1: (11), (23), (30), 32, (35), (39), 55, (57), 62, (66), (74).

³6th ed: 14.2 #9 is slightly different from the 7th ed. problem; solve either one.

⁴6th ed: to bottom of p. 886.

⁵6th ed: 14.3: (5), 10, (11), 24, (35), (39), 40, 45, (49), 51, (59), 73, 75, 82, 87.

14.3 #45 is slightly different from 14.3 #47 of 7th ed.; solve either one.