

MATH 281 FALL 2023
HOMEWORK 6
“DUE” NOVEMBER 6, 2023.
INSTRUCTOR: ROBERT LIPSHITZ

Required problems:

(Quiz problems drawn from these.)

- Section 14.3: 5, 6, 11, 13, 23, 37, 47, 53, 59, 65, 69, 74, 85, 95.
- Section 14.4: 7, 11, 17, 25, 45, 50.
- Section 14.5: 5, 9, 15, 17*, 23, 25, 35, 40, 45, 51.

If you got help with one of these problems, solve a similar one on your own!

Suggested challenge problems:

(Conceptually interesting problems in the text to think about. Will not be on a quiz.)

- There are lots of story problems with functions of several variables one might actually care about in different fields (e.g., physics, chemistry, economics). Read through, and maybe solve, the ones in your area. Some are listed below.
- If you're in economics, I recommend the “Discovery Project” after Section 14.3.
- 14.3: 77, 78, 82, 84, 97, 101.
- 14.4: 52, 54.
- 14.5: 46, 48, 55–59.

Comments on some of these problems:

- 14.3.95: This is a good problem, and quick if you understand it.
- 14.4.11: Like all of the problems with the little graph icon next to them, you are intended to use a computer for graphing here.
- 14.4.45: If you're in experimental science, you should see this kind of reasoning for error analysis / error control, for more important topics than volumes of cylinders.
- 14.4.54: This is an important example for understanding the meaning of being *differentiable* for a function of two variables, and the relationship with having partial derivatives, though we won't focus on that in this course.
- **14.5.17:** There's a **typo** in this problem. Where it writes $p(t) = (g(t), h(t))$ it should be $p(t) = f(g(t), h(t))$.
- 14.5.23: I'm never going to ask you to draw a “tree diagram,” but it's not a bad way to remember the chain rule. (Any method that works for you is fine.)
- 14.5.51: This turns out to be important in differential equations / the physics of waves. 14.5.55 also comes up in differential equations. (The others in this series also do sometimes.)

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