

Multivariable Calculus: Problem Set 3B

Packer Collegiate Institute | Mr. Shah | 2008-2009

Instructions: You are encouraged to discuss general strategies to approach the questions on this problem set with your classmates, but you must work and write up your solutions to the problems entirely on your own. Of course, you are always welcome to meet with me to talk about any question you are having difficulty with. Please pay attention to making your solutions as clear as possible for the reader; mathematical communication is an important skill that you will develop in this course.

Special Note: This problem set is going to be slightly different than the others you've had. You are going to be doing a total of ONE assigned problem – which you can work collaboratively as you have for the others. The rest of the problem set is to create your own problem set! Further instructions are below.

Problem 1

Do problem 45 from Anton, Chapter 14, Section 8 (on page 1006)

Problems 2-4

On this part of the problem set, you should not collaborate with anyone from the rest of the class. Your task is to create or find 3 problem set problems – one on “Tangent Planes and Normal Vectors” (Section 14.7), one on “Maxima and Minima of Functions of Two Variables” (Section 14.8), and one on “Lagrange Multipliers” (Section 14.9). For each problem, you have to (a) write the problem, (b) do a formal write up, and (c) write 3-5 sentences explaining why you think the problem is worthy of being on your problem set. They must be typed up.

Here are some guidelines. *Problem set problems are not easy and are not formulaic.* Although some problems may take only a half-page to solve, even these problems involve more than just applying a formula. They involve some conceptual understanding of what's going on.

At least one problem must be entirely made up by you. You can use any resource as inspiration, but the problem must be your own.

The other two problems can be problems you've found elsewhere.¹ The math department has a lot of calculus books by other authors and publishers. You are welcome to use those; see me to check them out of the math office. You can also use the internet to find some good problems. I've culled a bunch of great resources (textbooks, problem sets from other schools, websites) for you here, after weeding out the terrible ones:

<http://multivariablecalculus.wordpress.com>

If you click on “Textbooks, Problems, Exams” on the navigation bar, you will be directed to a number of good useful sites. Personally, I've had good luck with the MIT Open Courseware and Phillips Exeter Academy problem sets.

If you decide to work on a particular problem that you think might be good for the problem set, and spend hours on it, and then are still stuck, please come see me. I might be able to help you get unstuck, or at least give you permission to use what you have instead of finding an entirely new problem to work on.

Remember to carefully cite where you got each problem.

If you have any questions, please talk to me individually.

¹You may get at most one of your problems from Anton, although I strongly encourage you not to use Anton at all.