

College of the Redwoods
Mathematics Department

Math 50C — Multivariable Calculus
Quiz #8

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Quiz Questions

Read Carefully! You have until Monday (11/26/07) to complete the quiz. The quiz is due at the beginning of class on Monday (11/26/07). Late quizzes are not accepted.

This quiz is open notes, open book. This includes any supplementary texts or online documents. You must answer all of the exercises on your own. You are not allowed to work in groups or pairs on the quiz. You are not allowed to enlist the aid of a tutor or friend to help with the quiz. You are not allowed to read the exercises in the quiz, then seek help on similar questions. Once you open the quiz and read the questions, you may not seek any outside help of any kind.

I am not interested in reading pages and pages of calculations without accompanying narrative. It is essential that you include sound mathematical writing that both explains and justifies your solution or proof. Grammar and punctuation are important, as is the organization of your solution on the written page.

When working in the lab, please do not work at a terminal next to any other student who is also working on the quiz. For the sake of propriety, please separate yourselves when working on the quiz in the lab. Know that PS110 is also available for computer work. You can log onto the computers in PS110 and obtain files in your account in exactly the same manner as in PS116.

For information on transferring files from home, see the links for connecting to MSEM Mac from both PC's and Macs on the syllabus.

<http://online.redwoods.edu/instruct/darnold/MULTCALC/Syl.htm>

Place the solution to each exercise on a separate sheet of paper. On a good sheet of paper, write out (longhand) and sign the following honor pledge.

I promise that all work found herein is my own. I have received no help from tutors, colleagues, or other teachers. I also promise that I have refrained from sharing my work and ideas with other students in the class. I have also honored all of the quiz constraints listed in the directions.

Arrange your solutions in order, place these quiz page(s) on top of your solutions, then place the honor pledge on top of the quiz as a cover sheet. Staple. Good luck!

EXERCISE 1. Consider the function $f : \mathbb{R}^2 \rightarrow \mathbb{R}$ defined by

$$f(x, y) = 8x^3 + y^3 + 6xy.$$

- Use Matlab's `mesh` command to sketch the surface over a domain of your choice. Try to pick a domain that highlights the extreme values on the surface (minimums, maximums, saddle points). Use Matlab's annotation tools to indicate extreme values on the surface.
- Use Matlab's `contour` command to draw level curves of the given function. Again, pick a domain that highlights critical points of extreme values. Add a grid to your plot, selectively label contours with the `clabel` command, and annotate your plot with Matlab's annotation tools.
- In red, sketch the curve $f_x(x, y) = 0$, then sketch the curve $f_y(x, y) = 0$ in blue on the same coordinate system. This can be done by hand on graph paper or you can use Matlab. Solve the resulting system manually, then label the critical points on your plot with their coordinates.
- Use the second derivative test to classify each critical point. Summarize your results in a table.