

21C Homework 3

Due Friday April 22

Steinillos \equiv “Calculus and Analytic Geometry”, 5th Edition,
S.K. Stein and A. Barcellos

Question 1 Let $f(x, y) = xy$. What is $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$? Is $f(x, y)$ continuous at the origin? Prove your result. Give an example of a function $f(x, y)$ discontinuous at the origin even though $\lim_{(x,y) \rightarrow (0,0)} f(x, y)$ exists.

Question 2 Steinillos, §14.5, pp 814-815, qq 2, 4, 6, 8, 14, 18, 21, 23, 26, 30, 34, 38.

Question 3 Steinillos, §14.6, pp 828-829, qq 2, 6, 10, 12 (needn't include diagrams), 16, 18, 26, 28, 30.

Question 4 Explain why the partial derivative $\frac{\partial}{\partial x}$ can be interpreted as a vector. Limit your verbosity to a single page.

Question 5 Two useful techniques for visualizing surfaces are traces and level curves. Can you relate the two methods¹? Draw some sketches to illustrate your idea(s). Short is sweet!

¹Somebody asked me this nice question after class—anonymous thanx!