

Written Homework 13

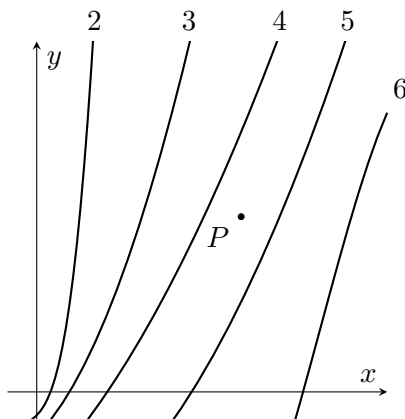
MATH 126

Solve each of the following problems. Work out your problems on scratch paper first, then write your solutions neatly on the pages you plan to turn in. Write the problems in assigned order, with each problem clearly labeled. Use words to clearly explain your work and methods. The reader should never have to guess or infer your intentions.

For a brief guide to writing homework solutions, see *Writing Mathematics Well* from Harvey Mudd College.

Scan or photograph your solutions and submit them (as a single file) to the Written Homework 13 assignment on Moodle.

1. Level curves for a function f are shown below. Determine whether each of the first partial derivatives f_x and f_y are positive or negative at the point P . Explain your reasoning.



2. Let $f(x, y) = \int_x^y (t^2 + 1) dt$. Find the partial derivatives f_x and f_y .
3. Let $f(x, y) = x \sin(x + 2y)$. Show that $f_{xy} = f_{yx}$.
4. Let $f(x, y) = 3\sqrt{x} + 2y^2$.
 - (a) Find the equation of the tangent plane to f at the point $(4, 3)$.
 - (b) Use your linearization from part (a) to approximate the values of f at the points $(4.2, 3.05)$ and $(4.5, 2)$.
 - (c) Compare the approximations from part (b) to the exact values of f at the points $(4.2, 3.05)$ and $(4.5, 2)$. Which approximation is more accurate? Explain why this should be expected.