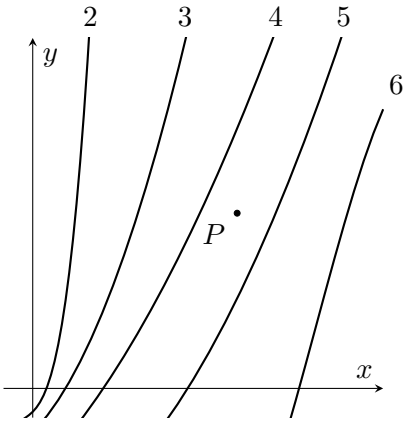
Written Homework 15

Math 126

Solve each of the following problems. Write your solutions clearly and neatly on separate paper, explaining your reasoning with complete sentences. Submit your work either in class or in the homework mailbox (RMS level 3, near the fireplace) by 4:00pm on **Friday, November 22**.

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



2. Let $f(x, y) = x \sin(x + 2y)$. Show that $f_{xy} = f_{yx}$.

3. Let $f(x, y) = xe^{xy}$.

(a) Find the partial derivatives f_x and f_y.

(b) Verify that f_x and f_y exist and are continuous at all points (x, y). Conclude that the graph of $f(x, y)$ has a tangent plane at all points.

(c) Write the equation of the plane tangent to $f(x, y)$ at the point $(2, 0)$.

(d) Use the tangent plane (linearization) to approximate the value of $f(2.1, -0.1)$. Compare this to the actual value of $f(2.1, -0.1)$.