

Assignment 15 (5/6)

Subhadip Chowdhury

Problem 1

Note that $\frac{\partial^2 f}{\partial x \partial y}$ means $\frac{\partial}{\partial x} \left(\frac{\partial f}{\partial y} \right)$ and is also denoted as f_{xy} . Similarly $\frac{\partial^3 f}{\partial x^2 \partial y}$ means $\frac{\partial}{\partial x} \left(\frac{\partial}{\partial x} \left(\frac{\partial f}{\partial y} \right) \right)$ and denoted as f_{xxy} .

Problems 12.2.(37, 38, 50).

Problem 2

Note: Read theorem A on page 630.

Problems 12.3.(2, 4, 6, 9, 11, 14, 16, 35, 37).

Problem 3

Let

$$f(x, y) = \begin{cases} xy \frac{x^2 - y^2}{x^2 + y^2} & (x, y) \neq (0, 0) \\ 0 & (x, y) = (0, 0) \end{cases}$$

Note that in general, $\frac{\partial f}{\partial x}(x, y) = \lim_{h \rightarrow 0} \frac{f(x+h, y) - f(x, y)}{h}$ and $\frac{\partial f}{\partial y}(x, y) = \lim_{h \rightarrow 0} \frac{f(x, y+h) - f(x, y)}{h}$.

1. Find $f_x(0, y)$. Then find $f_{yx}(0, 0)$.
2. Similarly find $f_{xy}(0, 0)$.