

MA1311 (Advanced Calculus) Tutorial/Exercise sheet 6

[November 4 – 5, 2010]

Please hand in your work at the tutorial. At the tutorial you can ask about things that you don't know how to do, here or on previous sheets.

1. Find the partial derivatives with respect to x and y evaluated at $(x_0, y_0) = (2, -2)$ for

$$f(x, y) = \frac{x \cos(\pi y)}{x^2 + y^2}$$

2. Find the partials $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ evaluated at (x_0, y_0) (which means $\frac{\partial f}{\partial x} \big|_{(x_0, y_0)} = f_x(x_0, y_0)$ and $\frac{\partial f}{\partial y} \big|_{(x_0, y_0)} = f_y(x_0, y_0)$) for the following cases.

(a) $f(x, y) = e^{(x+2y-3)}, (x_0, y_0) = (-1, 1)$

(b) $f(x, y) = \sqrt{x^2 + y^2}, (x_0, y_0) = (-3, 4)$

(c) $f(x, y) = \frac{1}{\sqrt{x^2 + y^2}}, (x_0, y_0) = (3, -4)$

(d) $f(x, y) = \frac{1}{\sqrt{x^2 + y^2}}, (x_0, y_0) = (3, -4)$

(e) $f(x, y) = \cos^2(3\pi x^2 - \pi y^4), (x_0, y_0) = (1, 0)$

3. Find the partials $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ (as functions of (x, y)) for the following cases

(a) $f(x, y) = 3x^2y - 8x^3y^2 + 5x^4y - 17$

(b) $f(x, y) = \frac{x - y}{x + xy + y - 1}$

(c) $f(x, y) = \frac{xe^{xy} - x^2 \sin(x + y)}{x + e^{(x+y)}}$