

MATH 147 Review: Partial Derivatives

1. Let $f(u, v) = u^2 \sin(u + v^3) - \sec(4u) \tan^{-1}(2v)$. Find f_u and f_v .

Solution:

$$\begin{aligned} f_u &= 2u \sin(u + v^3) + u^2 \cos(u + v^3) - 4 \sec(4u) \tan(4u) \tan^{-1}(2v) \\ f_v &= 3v^2 u^2 \cos(u + v^3) - \frac{2 \sec(4u)}{1 + 4v^2} \end{aligned}$$

2. Let $f(x, y) = \frac{x^2}{y^2 + 1} - \frac{y^2}{x^2 + y}$. Find f_x and f_y .

Solution:

$$\begin{aligned} f_x &= \frac{2x}{y^2 + 1} + \frac{2xy^2}{(x^2 + y)^2} \\ f_y &= \frac{-2yx^2}{(y^2 + 1)^2} + \frac{-2yx^2 - y^2}{(x^2 + y)^2} \end{aligned}$$