

14.3 Group work

14.3: Functions of multiple variables

1. Find $f_{xx}(x, y)$, $f_{xy}(x, y)$, and $f_{yy}(x, y)$

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

(b) $f(x, y) = \ln(x) \sin(\pi y)$

2. Find all first order partial derivatives of the function $h(x, y, z, t) = x^2y \cos(z/t)$

3. Verify Clairaut's theorem for $f(x, y) = (2x + 3y^2)^{10}$

4. Consider the surface

$$\frac{x^2}{4} + 2y^2 - z^2 = 1$$

Use implicit differentiation to express both $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial y}$ as functions of x and y .