

Section 14.2: Computing Partial Derivatives Algebraically

Computing a partial derivative of a function $f(x, y)$ with respect to a single variable is as simple as just treating the other variable as a constant and computing a derivative. For example, to compute the partial derivative $f_x(x, y)$, treat y as a constant.

Examples:

1. Find f_x and f_y if $f(x, y) = 5x^2y^3 + 8xy^2 - 3x^2$

2. Find $\frac{\partial}{\partial y}(3x^5y^7 + 8xy^2 - 3x^2)$

3. Find $\frac{\partial z}{\partial x}$ if $z = \frac{1}{2x^2ay} + \frac{3x^5abc}{y}$.

4. Find $\frac{\partial}{\partial t} e^{\sin(x+ct)}$.

5. Find $\frac{\partial}{\partial a} \left(\frac{1}{a} e^{-x^2/a^2} \right)$

6. Find $\left. \frac{\partial f}{\partial x} \right|_{(\pi/3, 1)}$ if $f(x, y) = x \ln(y \cos x)$.