

Answer on Question #56829 – Math – Calculus

What is partial derivatives?

Solution

Partial derivatives are defined as derivatives of a function of multiple variables when all but the variable of interest are held fixed during the differentiation.

$$\begin{aligned} f_{x_m}(x_1, x_2, \dots, x_n) &= \frac{\partial f}{\partial x_m} = \\ &= \lim_{h \rightarrow 0} \frac{f(x_1, x_2, \dots, x_{m-1}, x_m + h, x_{m+1}, \dots, x_n) - f(x_1, x_2, \dots, x_{m-1}, x_m, x_{m+1}, \dots, x_n)}{h} \end{aligned}$$

For example, to compute $f_x(x, y)$ all we need to do is treat all the y 's as constants (or numbers) and then differentiate $f(x, y)$ with respect to x as always.

To compute $f_y(x, y)$ all we need to do is treat all the x 's as constants (or numbers) and then differentiate $f(x, y)$ with respect to y as always.