Partial Derivatives

Lecture 41
Section 7.2

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Objectives

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- Define the partial derivatives of a function.
- Interpret the partial derivatives.
- Use the limit definition to find partial derivatives.

Partial Derivatives

Definition (Partial Derivative with Respect to a Variable)

Let $f(x, y)$ be a function of two variables. The **partial derivative of** f **with respect to** x is the derivative of $f(x, y)$ if we treat y as a constant.

Partial Derivatives

Notation (Partial Derivative)

The partial derivative of f with respect to x is denoted

$$\frac{\partial f}{\partial x} \quad \text{or} \quad f_x(x, y).$$

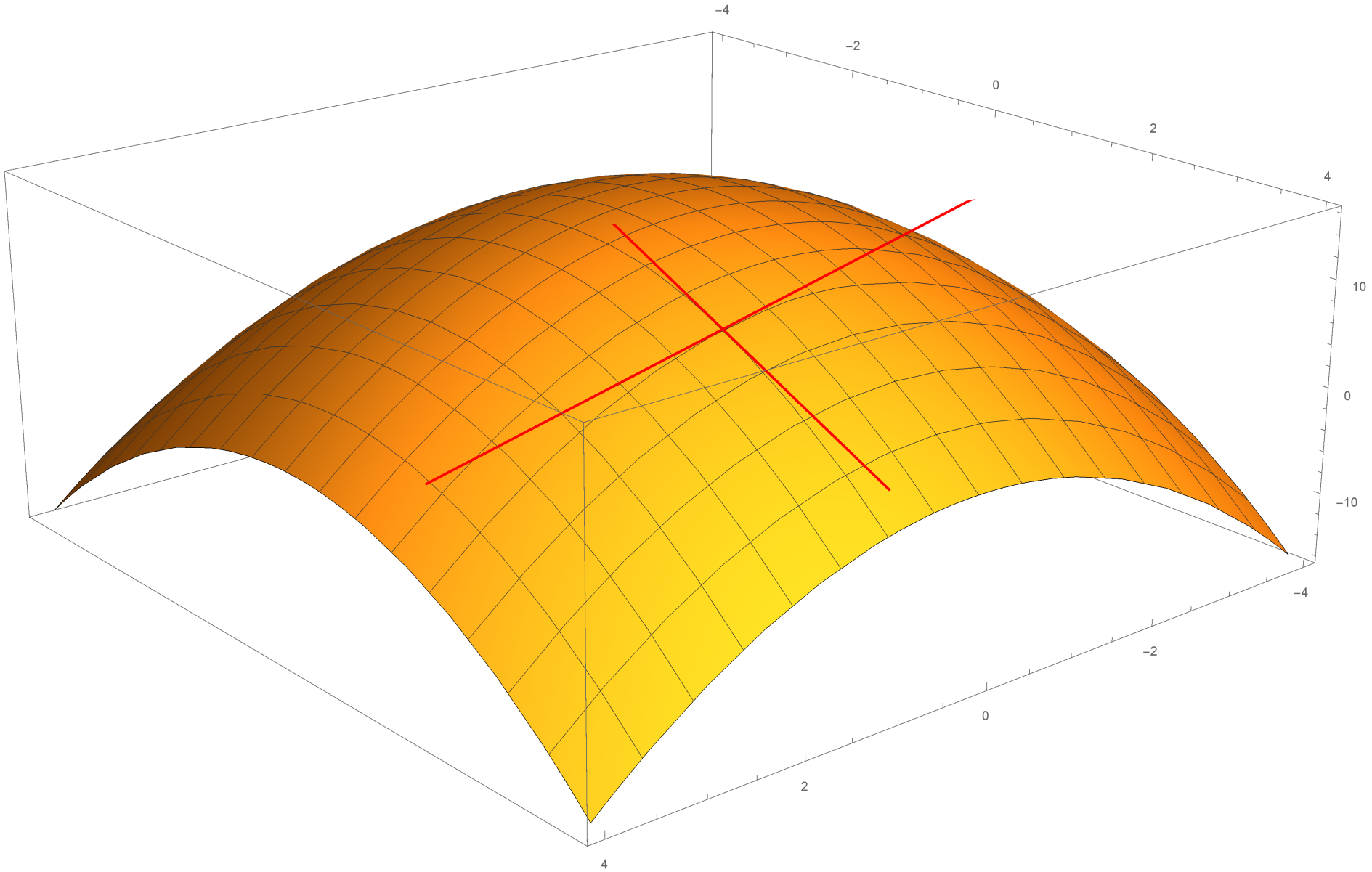
The Limit Definition

Definition (The Limit Definition)

$$\frac{\partial f}{\partial x} = \lim_{h \to 0} \frac{f(x+h, y) - f(x, y)}{h}$$

and

$$\frac{\partial f}{\partial y} = \lim_{h \to 0} \frac{f(x, y+h) - f(x, y)}{h}.$$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