

A note on multivariable calculus and partial derivatives

While multivariable calculus is not required for this class as a prerequisite, we do utilize some of its theory. The disadvantage of this is that we need to take a quick detour to learn about partial derivatives. The advantage of this is that you learn about partial derivatives!

Definition:

A **partial derivative** of a multivariable function is a derivative with respect to one of the dependent variables, with the others held constant.

Essentially, you treat one of the dependent variables as the 'variable' and the others you view as 'constants.' Then you take the derivative with respect to the variable just as you would with single-variable calculus.

To highlight which variable the derivative is being taken with respect to, we utilize notations such as $\frac{\partial}{\partial x}$, $\frac{\partial}{\partial y}$, $\frac{\partial}{\partial z}$, etc., to represent the derivative operator. Thus, $\frac{\partial f}{\partial y}$ would represent the derivative of a function f with respect to the variable y .

Discussion, comments, and examples:

Math45-Module-01-Video-02

WeBWork module 01 exercises:

- Problems 3, 4.

Relevant Wikipedia articles:

- [Partial derivatives](https://en.wikipedia.org/wiki/Partial_derivative) [_\(https://en.wikipedia.org/wiki/Partial_derivative\)](https://en.wikipedia.org/wiki/Partial_derivative)