

# Calculus 131, Chapter 9 Summary ~ things you should know

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## Important concepts:

functions of multiple variables

partial derivatives, second partial derivatives, and mixed partial derivatives

relative maxima and minima of functions of more than one variable

first and second derivative tests for functions of more than one variable

double integrals

## Be able to:

evaluate a function of more than one variable, given the function and values

formulate the equation for a function of multiple variables in a given application

graph the first-octant portion of a plane  $ax + by + cz = d$ .

derive the level curves for given values of  $z$  in a function  $f(x, y)$

find the equations for all partial derivatives, second partial derivatives, and mixed partial derivatives of a given function

evaluate first- and second-order partial derivatives at specified values

use first derivative test to identify possible relative maxima and minima

use second derivative test to determine whether points are relative maxima, relative minima, or neither

evaluate double integrals:  $\int_a^b \int_c^d f(x, y) dx dy$ ,  $\iint_R f(x, y) dx dy$  over a rectangular region  $R$ , volume under a surface with a given equation

find average value of a function  $f(x, y)$

## Review exercises from the text:

Chapter 9 Review Exercises, 4 – 9, 14 – 41, 51 – 68, 73 – 76, 80 – 83