

Daily Prep Assignment for Feb 16th

Overview

Functions of several variables will be the main focus of Chapters 10 and 11, where we will analyze these functions by looking at their graphs, calculating limits, differentiating, integrating, and more. We will see that many of the ideas from single variable calculus translate well to functions of several variables, but we will have to make some adjustments as well. In chapter 9 (this first chapter) we introduce functions of several variables and then discuss some of the tools (vectors and vector-valued functions) that will help us understand and analyze functions of several variables.

Basic learning objectives

These are the tasks you should be able to perform with reasonable fluency **when you arrive at our next class meeting**. Important new vocabulary words are indicated *in italics*.

- Understand what a *function of several variables* is.
- Understand that the graph of a function of two variables is a *surface in space*.
- Recognize the equation of planes in space and be able to sketch them.
- Be able to compute dot products and interpret its meaning geometrically.
- Understand the definition of the *cross product*.

Advanced learning objectives

In addition to mastering the basic objectives, here are the tasks you should be able to perform **after class, with practice**.

- Identify and sketch the traces of function of several variables.
- Given a function of several variables, sketch level curves. Given level curves describe key features of the function they came from.
- Recognize common functions of two or three variables and be able to sketch them.
- Understand the geometric properties of the cross product and use them to solve geometric problems in 3D.

To prepare for class

Preview activities:

- Preview activity 9.1.1.
- Preview Activity 9.4.1

Reading:

- Read section 9.1.
- Skim sections 9.2 and 9.3, review anything that does not feel familiar from Linear algebra.
- Read section 9.4.

Watching: Watch these additional resources if you need support reading the text.

1. Overview of 9.1: <https://youtu.be/QTUx6IFYiO8>
2. Overview of 9.2: <https://youtu.be/mzaOytS6dog>
3. Overview of 9.3: https://youtu.be/buLmMA_Z3_k
4. Overview of 9.4: <https://youtu.be/mdwqZS1I838>

During and after class

- Activity 9.1.2.
- Activity 9.1.4.
- Activity 9.1.6.
- Activity 9.1.7.
- Activity 9.1.8.
- Activity 9.3.3.
- Activity 9.4.2.
- Activity 9.4.3.
- Activity 9.4.4.
- Webwork for optional practice.