

MTH 201: Calculus

Daily Preparation, Module 8A: The Extreme Value Theorem and global extreme values

Due by: 11:59pm ET, **TUESDAY**, October 27 (Note the different date!)

Estimated time requirement: About 45-60 minutes for the whole assignment. *If you have worked on this assignment for 30 minutes and you're not at least halfway done, DON'T work any further — instead, stop and ask for help* on the `#dailyprep` channel on CampusWire.

Overview

Module 8 is a continuation of the concepts of Module 7 where we analyzed the behavior of a function by finding and classifying its critical values and examining its concavity; it's also an important setup for Module 9, where we look at applied problems involving finding the “best” values of a function. In Module 8A we introduce the **Extreme Value Theorem**, which states that every continuous function has an absolute/global maximum and minimum function if it's constrained to a closed interval. This mathematical result gives us a simplified process for finding global max and min values of functions.

What you will learn

Learning Targets addressed in this module:

- **DA.3:** I can use the Extreme Value Theorem to find the absolute maximum and minimum values of a continuous function on a closed interval.

BEFORE your class meeting, use the Resources for Learning (below) to learn how to do the following:

- (Review) Find the critical values of a function using its first derivative, and classify them using the First or Second Derivative Tests.
- (Review) State the definition of a **closed interval**.
- (Review) State informally what it means for a function to be **continuous on a closed interval**.
- State the **Extreme Value Theorem** and explain the three-step process it provides for finding the absolute extreme values of a continuous function on a closed interval.

DURING AND AFTER your class meeting, you will learn how to do the following:

- Apply the Extreme Value Theorem to find the absolute maximum and minimum values of a continuous function on a closed interval.

- Given an applied setting, build a function that models the situation; identify a closed interval for its domain; then identify its absolute maximum and minimum values on the interval.

Resources for Learning

Text: In the *Active Calculus* text, read [Section 3.3](#).

Video: Watch the following from the GVSUMath Calculus playlist.

- Screencast 3.3.1: Quick review – Global optimization (2:31) https://www.youtube.com/watch?v=IdJfxeGHv3Y&list=PL9bljQJDwfGuXQHUS5Jkmum_CFILoCZX-&index=66
- Screencast 3.3.2: Finding absolute extreme values (8:08) https://www.youtube.com/watch?v=YE57SJzL8r8&list=PL9bljQJDwfGuXQHUS5Jkmum_CFILoCZX-&index=67
- Screencast 3.3.3: Optimizing population (7:09) https://www.youtube.com/watch?v=kz9JFNIQVVI&list=PL9bljQJDwfGuXQHUS5Jkmum_CFILoCZX-&index=68

You are free to search for and use other resources in addition to, or instead of the above, as long as you can work the exercises below.

Exercises

The exercises are on Classkick. If you need codes, they are:

- Section 02: NDC NP7
- Section 04: Z50 NRE

Submission, grading, and getting help

Submitting your work: Just work through the activities; your work is saved as you go.

How this is graded: Daily Prep assignments are graded on the basis of *completeness and effort*: If your submission has **all parts completed** (no blank entries, even if left blank accidentally) and **a good-faith effort to provide a correct solution or explanation is given** (no responses of “I don’t know” or “I didn’t understand”) and **the work is submitted on time**, it gets a “check”. Otherwise it gets an “x”. If you are stuck on an item, you’re expected to ask questions and give your best effort.

Getting help on this assignment: *You may work with others on this assignment, but you may not copy each others’ answers.* Evidence of copying will be treated as academic dishonesty. You may also ask questions on the #dailyprep channel on CampusWire, but you may not ask simply to be given the answers; giving and receiving answers on CampusWire will be treated as academic dishonesty.

