MTH 201: Calculus

Guided Practice, Module 1a: How do we measure velocity?

Due by: 11:59pm Eastern, Tuesday September 1.

Estimated time requirement: About 60 minutes for the whole assignment. *If you have worked on this assignment for 60 minutes and you're stuck, please DON'T work any further* — instead, stop and ask for help on the `#guidedpractice` channel on CampusWire.

Overview

If an object is moving but at a continuously changing speed, how do you tell how fast it's going at a single moment in time? This simple question launches our study of calculus this semester. We will approach it by looking at the concept of average velocity, using a connection to the slope of a line. Then we'll introduce the concept of instantaneous velocity and how to measure it.

What you will learn in this module

Learning Targets addressed in this module:

> **L.1 (Core):** I can evaluate the limit (including one-sided and infinite limits) of a function at a point using graphical, numerical, or algebraic methods or explain why a limit fails to exist.

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

- Compute the average velocity of a function on an interval using either of the average velocity formulas.
- Explain the differences between average velocity and instantaneous velocity.

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

- Find the instantanous velocity of a moving object through a sequence of average velocities.

Resources for Learning

Text: Read through Section 1.1 of the *Active Calculus* textbook: https://activecalculus.org/single/sec-1-1-vel.html Work through the examples and all interactive exercises found at the end of the section.

Video: At the MTH 201 playlist on YouTube (http://bit.ly/GVSUCalculus), watch the following videos. The total running time is 32:48.

- Screencast 1.1.1: Using the average velocity formula (7:39) https://www.youtube.com/watch?v=6HPe7iwr88k
- Screencast 1.1.2: Alternative average velocity formula (11:06) https://www.youtube.com/watch?v=O_Z9osv6VGk
- Screencast 1.1.3: Finding instantaneous velocity (14:03) https://www.youtube.com/watch?v=j8kJubOTkME

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 for this Guided Practice are found at the links below. **Be sure to use only the link that corresponds to your course section.**

- Students in Section 02 (10:00-10:50am meetings): https://student.desmos.com/join/4qmfe4
- Students in Section 04 (3:00-3:50pm meetings): https://student.desmos.com/join/zuuwcg

Submission, grading, and getting help

Submitting your work: To submit your work, just work through to the last part of the Desmos activity. Your work will be submitted as you go, so once you reach the end, you can just close out the window.

How this is graded: Guided Practice assignments are graded either **P** (Pass) or **NP** (Does not Pass). You will receive a **P** if your work: (1) is submitted by the deadline, and (2) each required exercise has a response that reflects a good-faith effort to attain a correct answer. *Mathematical correctness is not required for a grade of P, only completeness, effort, and meeting the deadline.* However, your work will receive an **NP** if your work is late, *or* if a required item is left blank (even accidentally), *or* if a required item does not show a good-faith effort to be right — including responses of "I don't know", "I didn't understand", and so on. 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 #guidedpractice 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.