MTH 201: Calculus

Daily Preparation, Module 11A: The definite integral of a function

Due by: 11:59pm ET, Tuesday, November 17

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

In Module 11 we formally introduce the last Big Idea of MTH 201: The **definite integral** of a function on an interval. The definite integral (or just "integral") of a function is to finding area what the derivative of a function is to finding slopes — it's a generic idea that expresses many of the concepts we saw in Module 10 regarding area under a curve, total distance traveled, and so on. In Module 11A we will introduce the idea and make sense of the notation used, and look at basic ways to calculate definite integrals and interpret the results.

What you will learn

Learning Targets addressed in this module:

- **INT.2**: I can explain the meaning of each part of the definition of the definite integral in terms of a graph, and interpret the definite integral in terms of areas, net change, and displacement.
- **INT.3**: I can evaluate a definite integral using geometric formulas and the Properties of the Definite Integral.

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

- State the definition of the definite integral of a function on an interval, and explain the meaning of each part of the notation.
- Explain what the definite integral of a function on an interval tells you, in terms of area and the graph of the function.
- Evaluate a definite integral exactly by interpreting it as an area, if the function given is made of lines and/or circles.

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

- Use the Properties of the Definite Integral to compute, manipulate, and simplify definite integrals.

- Calculate the average value of a function on an interval.

Resources for Learning

I recommend watching the videos first for this Module.

Video: Watch these at the GVSUMath YouTube playlist:

- Screencast 4.3.1 – Quick review: The definite integral (3:01) https://www.youtube.com/watch?v=Lp5KsXN4UOQ&list=PL9bIjQJDwfGuXQHuS5Jkmum_CFILoCZX-&index=84
- Screencast 4.3.2 – Calculating a definite integral using geometry (6:47) https://www.youtube.com/watch?v=oHlH69Ou4DE&list=PL9bIjQJDwfGuXQHuS5Jkmum_CFILoCZX-&index=85
- Screencast 4.3.3 – Evaluating definite integrals using integral properties (8:15) https://www.youtube.com/watch?v=1SqpYAAyBCk&list=PL9bIjQJDwfGuXQHuS5Jkmum_CFILoCZX-&index=86
- Screencast 4.3.4 – Average value of a function (7:35) https://www.youtube.com/watch?v=MQG9Nur4fdM&list=PL9bIjQJDwfGuXQHuS5Jkmum_CFILoCZX-&index=87

Text: In the *Active Calculus* text, read Section 4.3.

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

These are on Classkick. Go to app.classkick.com and log in, and it should be in your list. If you need a code:

- Section 02: `ULB OMD`
- Section 04: `VE5 7VS`

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.