MTH 201: Calculus

Daily Preparation, Module 10B: Riemann sums

Due by: 11:59pm ET, Sunday, November 15

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 10A, we learned that we can estimate the distance traveled by a moving object with a known velocity, by estimating the area between its velocity curve and the horizontal axis. In Module 10B we introduce a systematic way to construct these estimates known as a **Riemann sum**. It's nothing mysterious — just the method we saw of sticking rectangles under the curve and adding up their areas — but it leads to a breakthrough in answering the "distance traveled" question that we'll encounter in Module 11.

What you will learn

Learning Targets addressed in this module:

- **INT.1:** I can calculate the area between curves, net change, and displacement using geometric formulas and Riemann sums.

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

- Calculate a sum that's given in "sigma" notation.
- Estimate the area under a curve using a small number of rectangles whose heights are determined using left, right, and middle points.

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

- Explain the general process of setting up a Riemann sum.
- Calculate a simple left, right, and middle Riemann sum by hand.
- Determine whether a Riemann sum will be an overestimate or underestimate of the true area under a curve.
- Use a computer to set up and calculate a larger Riemann sum.

Resources for Learning

I recommend watching the videos first for this Module.

Video: Watch these at the GVSUMath YouTube playlist:

- Screencast 4.2.1 – Quick review: Riemann sums (3:29) https://www.youtube.com/watch?v=oUZdfIwDse0&list=PL9bIjQJDwfGuXQHuS5Jkmum_CFILoCZX-&index=79
- Screencast 4.2.2 – Sigma notation (7:15) https://www.youtube.com/watch?v=Eq-DCz52Ozs&list=PL9bIjQJDwfGuXQHuS5Jkmum_CFILoCZX-&index=80
- Screencast 4.2.3 – Computing a left-hand Riemann sum (8:55) https://www.youtube.com/watch?v=yVZX0YRRTvA&list=PL9bIjQJDwfGuXQHuS5Jkmum_CFILoCZX-&index=81
- Screencast 4.2.3(b) – Another Riemann sum example (10:34) https://www.youtube.com/watch?v=FvhD3BbIfvI&list=PL9bIjQJDwfGuXQHuS5Jkmum_CFILoCZX-&index=82
- Screencast 4.2.4 – Calculating right and midpoint Riemann sums (9:33) https://www.youtube.com/watch?v=zl02nRV4Ui4&list=PL9bIjQJDwfGuXQHuS5Jkmum_CFILoCZX-&index=83

Text: In the *Active Calculus* text, read Section 4.2.

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: `RX2 GNM`
- Section 04: `JB7 KE8`

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.