MTH 225: Discrete Structures for Computer Science 1

Daily Preparation, Module 10B: Arithmetic and geometric sequences

Due by: 11:59pm ET, **Thursday, November 12**

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. Remember these are graded just on completeness and effort — try to be right and understand everything, but don't get bogged down if you get stuck. Just give a good effort and move on, and ask a question.

Overview

In Module 10B we're going to focus on two common kinds of integer sequences: **arithmetic** sequences in which each pair of consecutive terms has a common difference (like $1, 4, 7, 10, 13, \ldots$) and **geometric** sequences in which each pair of consecutive terms has a common ratio (like $1, 4, 16, 64, 256, \ldots$). These sequences are common in everyday applications and it's particularly easy to find closed formulas as well as recursive definitions for them, so they're a good place to start a deeper study of how to find generating expressions for sequences in general.

What you will learn

Learning Targets addressed in this module:

- **SR.3 (Core)**: I can find closed-form and recursive expressions for arithmetic and geometric sequences and find their sums.

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

- State the definition of an *arithmetic* sequence, and find the common difference of an arithmetic sequence.
- Determine whether a given sequence is arithmetic. If it is, state the common difference.
- State the definition of an *geometric* sequence, and find the common ratio of an geometric sequence.
- Determine whether a given sequence is geometric. If it is, state the common ratio.

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

- Find closed formulas and recursive definitions for an arithmetic sequence.
- Find closed formulas and recursive definitions for a geometric sequence.
- Find the sum of terms in an arithmetic sequence.
- Find the sum of terms in a geometric sequence.

Resources for Learning

Reading: Read through Section 2.2 of the Levin textbook. Be sure to **read actively**: Take notes, ask questions, work through the examples, work through some of the exercises.

Video:

- Arithmetic sequences: A formula for the "n-th" term (11:05) https://www.youtube.com/watch?v=lj_X9JVSF8k <-- This is actually a pretty complete introduction to the whole concept of arithmetic sequences, not just how to find a closed formula for one.
- A quick intro to geometric sequences (7:11) https://www.youtube.com/watch?v=C7tE26CDI2M
- Geometric sequences: A formula for the "n-th" term (7:03) https://www.youtube.com/watch?v=IGFQXInm-co <-- I'd consider this one optional, as it presents a way of getting a closed formula for a geometric sequence in a different way than what's described in your text.

Exercises

The exercises are on the following Google Form:
https://docs.google.com/forms/d/e/1FAIpQLSc_5UnGPtE8OVbZ0Ps-b_oeuNomuBSHJkKI5PnLDHnp8Xi7zw/viewform

Submission, grading, and getting help

Submitting your work: Your work is to be done on Classkick using the link/code above. Classkick saves your work as you go, so there's nothing to submit – just do the work and you're good.

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.