MTH 225: Discrete Structures for Computer Science 1

Daily Preparation, Module 5B: Sets operations

Due by: 11:59pm ET, Tuesday, October 6

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 5B, you'll learn about *operations* on sets, so that we will be able to take two sets and turn them into a third set using something almost like arithmetic. You'll learn about the **intersection**, **union**, **Cartesian product**, **difference**, and **complement** of sets as well as the **power set** and the **cardinality** of a set. We'll take a specific look at how the different set operations combine with each other and how to visualize the results with a **Venn diagram**.

What you will learn

Learning Targets addressed in this module:

- **SF.1 (Core)**: I can represent a set in roster notation and set-builder notation; determine if an object is an element of a set; and determine set relationships (equality, subset).
- **SF.2**: I can perform operations on sets (intersection, union, complement, Cartesian product) and determine the cardinality of a set.

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

- Given a set, state its cardinality.
- Given two sets, find their union, intersection, and set difference as well as the complement of each.

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

- Given a finite set A, list all the elements of $P(A)$ (the power set of A).
- Given two sets, find their Cartesian product.
- Draw accurate Venn diagrams visually representing a combination of two or three sets.

Resources for Learning

Text: Read the following from *Discrete Mathematics: An Open Introduction*:

- Section 0.3 starting where Example 0.3.3 ends, and continuing through the end.

Video: These were made by me for MTH 210 (Communicating in Mathematics) but they work for MTH 225 as well. Total running time is 12:32.

- Sets and set operations (8:18) https://www.youtube.com/watch?v=QiOfsWm3peE&list=PL2419488168AE7001&index=64
- Cardinality (7:50) https://www.youtube.com/watch?v=_aXwKJk8oBw&list=PL2419488168AE7001&index=67

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 as "Module 5B Daily Prep".

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.