

MATH 250: DAILY PREPARATION

Overview

Following our recent work on mathematical induction in Chapter 4, we are now ready to move on to the study of *set theory* in Chapter 5. As we have already seen in several settings, a *set* is a fundamental mathematical object (informally, a collection of things) that underlies nearly everything we study in mathematics. We will not only work to improve our fluency with sets and their elements, but also work to understand how certain theorems are fundamentally statements about sets and how thinking of sets as objects themselves enables us to prove meaningful and substantial relationships. The first section of Chapter 5, Section 5.1, primarily regards some of the basic “language” of sets.

Basic learning objectives

These are the tasks you should be able to perform with reasonable fluency **when you arrive at our next class meeting**. Important new vocabulary words are indicated *in italics*. **The screencasts will be especially helpful in preparation for today’s class.**

- Be comfortable with basic set notation and terminology, including the terms *element*, *subset*, and *equal*, along with the notation $x \in A$, $x \notin A$, $A \subset B$, $A \subseteq B$, $A = B$.
- Know and understand the definitions of the *intersection*, *union*, and *set difference* of two sets, as well as the *complement* of a set, along with corresponding notation.
- Understand how to use *Venn diagrams* to represent the intersection, union, or set difference of sets, as well as the complement of a set.

Advanced learning objectives

In addition to mastering the basic objectives, here are the tasks you should be able to perform in the near future **with practice and further study**:

- Be able to comfortably and correctly use set language and notation in a range of settings, problems, and proofs.
- Begin to understand how key subset and equality relationships among sets are consequences of general assumptions, such as in theorems like “If $A \subseteq B$, then $B^c \subseteq A^c$ ” or “If $A \cap B = \phi$, then $A \subseteq B^c$.”

Resources

Reading: Read pages 215-220.

Watching: Here are some additional resources that have been developed to support your learning:

- Screencast 5.1.1: <http://gvsu.edu/s/t0>
- Screencast 5.1.2: <http://gvsu.edu/s/tP>
- Screencast 5.1.3: <http://gvsu.edu/s/tq>

Questions

Respond to the following questions on separate paper, as explained in the document that describes guidelines and expectations for daily preparatory assignments. You should be prepared to show me your responses at the start of class; I will review your work briefly sometime before the end of class.

1. Complete Preview Activity 1 in Section 5.1.
2. Complete Preview Activity 2 in Section 5.1.
3. Complete Progress Check 5.3 on p. 220.