

MATH 250: DAILY PREPARATION

Overview

Tuesday will be devoted to discussion and work in Section 3.1, which is devoted to the topic of direct proofs. Here, we will continue to discuss how we prove a conditional statement of the form $P \rightarrow Q$ directly, and also use this motivating topic as an opportunity to learn more about the concept of *divisibility* among the integers, as well as *congruence modulo n* .

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*.

- Know the terms *definition*, *theorem*, *proof*, and *conjecture*, as well as the key differences and distinctions among these terms.
- Know the formal definition of what it means to say "*a divides b*", where *a* and *b* are integers.
- Understand the role a counterexample plays in deciding the truth of a given statement.

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**:

- Understand the definition of *congruence modulo n* and be able to use and apply the definition in various settings.
- Have read and studied the various Writing Guidelines on pages 22-24 and 94-95, and begin to put these guidelines to work in your own writing.
- Continue to develop understanding of how to prove a conditional statement directly and the role that definitions often play in our efforts.

Resources

Reading: Read Section 3.1 pages 82-91.

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

- Screencast 3.1.1: <http://gvsu.edu/s/rh>
- Screencast 3.1.1: <http://gvsu.edu/s/ri>

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, and write your answers to questions 1-11 in the activity on your paper.
2. Read Preview Activity 2, think about the questions there, and write your answer to question 3e in the activity on your paper.
3. What is a *counterexample* to a universally quantified statement? For instance, suppose I said “For every Duquesne student, if you are a freshman, then you are living in the dorms.” What would it mean to find a counterexample to this statement?
4. Complete Progress Check 3.3. Show your work on what you submit.