MATH 250: DAILY PREPARATION

Overview

So far, we have worked to dive right in to some of the main ideas in Math 250 by working to learn about and prove conditional statements. But there is some underlying logic and technical language that is important, and we will use much of our next meeting working to understand these underlying details. Perhaps the main formal idea to become comfortable with is the concept of *quantifiers* and the role they play in mathematical statements. Fundamentally, quantifiers come down to two questions: does a particular phenomenon in certain circumstances happen *at least one time*? does a particular phenomenon in certain circumstances happen *every time*?

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*.

- Understand what a *set*, *variable*, and *open sentence* are.
- Be comfortable with basic set notation: writing things such as $x \in A$, $y \notin B$, $C \subseteq D$.
- Know the definition of *subset*.
- Understand the idea of an *open sentence* and the role the variables play in such sentences.
- Know the *universal quantifier* and the *existential quantifier* and the roles they play in certain mathematical statements.

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 how to determine the truth set of an open sentence.
- Be comfortable and competent with the role that *quantifiers* play in mathematical statements. This includes being able to ascertain whether a given quantified statement is true or false, and correctly write the negation of any quantified statement.
- Recognize that quantifiers (particularly universal quantifiers) are often hidden.
- Be comfortable and competent negating quantified statements, particularly conditional statements.

Resources

Reading: Read pages 52-58 and pages 63-68.

Watching: Here are some additional resources that have been developed to support your learning (there's a bit more than 30 minutes of video below – I leave it up to you to watch as much as is helpful to you):

- Screencast 2.3.2: http://gvsu.edu/s/rj
- Screencast 2.3.3: http://gvsu.edu/s/rk
- Screencast 2.4.1: http://gvsu.edu/s/rl
- Screencast 2.4.2: http://gvsu.edu/s/rm

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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. Read through Previews 1 and 2 in Section 2.3. Think about each of the questions there, but only write your answer to #6 in Preview 2 for what you submit for this assignment.
2. Complete #1abc in Progress Check 2.11.
3. Read through Preview 1 in Section 2.4. Think about the questions there, but you can move on quickly. For Preview 2, please answer both questions 1 and 2 fully on your paper.
4. Write the negation of the following statement: "If x is an integer, then $x^2 + 1$ is even."