Review for Exam 2, Thursday, November 10

MATH 110: Discovering in Mathematics

Notes:

(1) To prepare for the exam, be sure that you have reviewed all class notes and Sections 2.7, 10.4 and 3.1-3.3 in the text. Below is a list of some types of problems you should know. This is not meant to be exhaustive!

(2) Remember that HOW you solve the problems is more important than what your final answers are. Be sure to justify all your work. Read the directions carefully! Most solutions will require sentences!

(3) Bring a pencil (or several!) with a good eraser.

(4) Neatness is a plus! Make sure I can follow your work on your exam.

(5) Remember that your journal is due at the exam. Double check to make sure you have completed all problems listed for your journal work. Doing these will help you review for the exam. I will be grading four problems completely and checking to see whether you have worked on the rest. Be sure your journal follows the guidelines (in a composition book, highlighted problem numbers, etc.)!

Some Types of Problems:

For all of these problems you should be able to explain the process and show the details, not just obtain a final answer.

(1) Express a terminating or repeating unending decimal as a fraction of natural numbers (i.e. proving that it is a rational number).

(2) Understand properties of real, rational and irrational numbers (for example, what their decimal expansions might look like) and be able to answer true/false or short answer questions about them.

(3) Be able to prove that two decimal expressions are equivalent (can you remember which we did?).

(4) Be able to determine whether or not there is a one-to-one correspondence between two finite sets.

(5) Be able to define cardinality and subset.

(6) Be able to describe different voting schemes.

(7) Given voting data, be able to determine who the winner of an election is with various voting schemes, and to determine which voting scheme you would use to force a certain winner.

(8) Describe the ideals we look for in a voting scheme, how some of our schemes can or cannot meet those ideals, and why there is no perfect scheme (quoting a theorem would be helpful here!).

(9) Show that there is a one-to-one correspondence between two infinite sets.

(10) Prove that there is no one-to-one correspondence between two infinite sets.

(11) Be able to apply the definition of one-to-one correspondence to a question.

(12) Use Cantor's diagonalization argument to produce a number not on a list of given correspondences.

(13) Any problem that is like a journal problem!