Math 210 - Dr. Miller - Topics List for Exam #1, Fall 2018 - Thursday, Sept. 27, 2018

Each exam's Topics List tells you what I'll expect of you on that exam and are outlines for writing your own, detailed study guides. Compare the list to your notes, in-class materials, reading, online links, quizzes, graded AND practice HW - you might want to recopy key definitions and explanations, rewrite thorough examples of tasks and solutions, jot down warnings of what not to do, etc. Strive to master concepts, explanations, and computational techniques in general; memorizing specific examples is seldom successful.

Problem Solving and Reasoning:

1. State Polya's Four Steps in order. Spell his name. Know that we use them for problem solving.
2. Memorize strategy names and characteristics from Summary #1. You need them for:
   (a) Given a problem, name several strategies that might/might NOT work in solving it.
   (b) Point out necessary characteristics of the problem to justify your strategy. Tell why, not how.
3. Fully solve a problem; explain your reasoning in terms of the math steps you chose, and why.
4. Tables/diagrams/pictures need labels; Guess and Check should explain improved guesses.
5. Practice flexibility - use new "tricks" you've seen - but prepare for VARIABLES to be forbidden.
6. Demonstrating/assessing your problem solving skills by definition involves new, unfamiliar situations, not just tasks you've seen in class; don't let that unfamiliarity scare or intimidate you.

Sequences: Algebra/variables - other than a_1, a_2, etc. - will not be permitted in sequence problems.

1. Find the next term(s) in a given sequence of numbers or diagrams. Explain when asked.
2. Read problems carefully to distinguish between finding/using a term (value) vs. a position.
3. Recognize given sequences that are arithmetic, geometric, Fibonacci-type, or no special type.
4. Sequences may use decimals, fractions, or negative numbers in general, or as CDs and CRs.
5. Find terms of a sequence when you're given information on its difference sequence.
6. Find terms of a Fibonacci-type sequence, given verbal information about some terms.
7. Find terms of arithmetic or geometric sequences based on verbal information.
8. Find distant terms for arithmetic or geometric sequences. Prepare to explain briefly.
9. You are not required to simplify expressions involving extremely large exponents.
10. Determine whether and where a given number can appear in a given arithmetic sequence; explain.

Sets: Use and understand correct notation (roster, subsets, operations, etc.) for all work with sets.

1. Be able to write in words exactly how to read set notation aloud; convert sentences to notation.
2. Understand, identify, or create equal or equivalent sets. Explain the difference.
3. Know, understand, and use the notation "$n()$" for the cardinality of a set.
4. Correctly use and understand $\in$, $\notin$, $\subseteq$, $\not\subseteq$ notation, including in true/false or fill-in-the-blank.
5. Know, use definitions and correct notation for natural numbers, whole numbers, empty set.
6. List all subsets of a given set; list some with certain properties or cardinality. Use the 2^n predictor.
7. Answer questions about an Attribute Game when told what labels are available.
8. Given a labeled Venn diagram, fully describe objects in a given region or cell; list all cells where items fitting a given description could go.
9. Use, find, understand notation for set operations: complement, intersection, union, difference.
10. Use correct notation to apply set operations, including several in a problem (i.e., parentheses).
11. Know, use the word disjoint. Understand universal sets. Don't repeat elements when listing.
12. Make up sets whose $\cup$, $\cap$, $\setminus$, or complement have certain qualities. When not possible, explain.

Bring an approved calculator: not cell phone, no text-based memory.
If you forget, you may borrow mine - for a THREE point deduction.