Math 102
Exam 2 Review Sheet

Section 12.1: Introduction to Counting Methods

Key Topics:
• Counting sets by listing in roster form
• Counting using tree diagrams

Section 12.2: The Fundamental Counting Principle

Key Topics:
• Using the Fundamental Counting Principle to count a task that can be broken into a several steps. (multiply the number of ways of doing each step)
• Using "Slot Diagrams" to organize information in a counting problem.
• Counting situations involving extra conditions or restrictions.

Section 12.3 Permutations and Combinations

Key Topics:
• Know the definitions of permutations and combinations, and how to determine whether a given example is a permutation, a combination, or neither (hint: in permutations, order matters)
• Memorize and be able to apply the counting formulas for both permutations and combinations:
$P(n,r) = \frac{n!}{(n-r)!}$ and $C(n,r) = \frac{n!}{r!(n-r)!}$

Section 12.FI: Counting and Gambling

Key Topics:
• Memorize the the basics of how a deck of cards is put together (52 cards, 4 suits) and be able to count the number of ways a given poker hands can occur.
• Know how to count the ways of winning in a game of chance such as a slot machine.

Section 1.3 The Language of Sets

Key Topics:
• The definition of a set and how to represent a set in both set-builder and roster notation.
• Understand the ides of well definedness and be able to determine whether a given set is well defined.
• Know common numerical sets (natural numbers, whole numbers, integers, etc.)
• Understand the concepts of universal sets, the empty set, and sets of sets.
• Understand the notation: $\in$, $\notin$, and the cardinal number of a set: $n(A)$

Section 1.4 Comparing Sets

Key Topics:
• Know the definitions of equality of sets and equivalence of sets and understand subsets and proper subsets.
• Be able to count the subsets of a set and be able to use Pascal's Triangle to find the number of subsets of a given size.

Practice Problems: Chapter 12 Test page 713-714 # 2, 4, 5, 8, 9, 10, 12, 14; Chapter 12 FI # 15, 16, 17;
Practice Problems: Chapter 1 Test page 68 # 4, 5, 7, 9, 12, 13, 14