

Math 102
Exam 2 Review Sheet

Section 13.1: Introduction to Counting Methods

Key Topics:

- Counting by making a list.
- Counting using tree diagrams.

Section 13.2: 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 13.3 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 $C(n, r) = \frac{n!}{r!(n-r)!}$
- Be able to apply one or more counting method in order to count the number of possibilities in a given situation. Also be able to account for extra restrictions on which choices are possible based either on stated conditions or facts about the underlying situation.

Section 13.4: 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.
- Also be able to solve more general counting problems involving playing cards, dice, or coins.
- Know how to count the ways of winning in a game of chance such as a slot machine.

Section 2.1 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 2.2 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 13 Test page 656-657 # 2, 4, 5, 6, 7, 8, 9, 12, 14, 16;

Practice Problems: Chapter 2 Test page 79-80 # 1, 2, 3, 5, 6, 7, 8, 9