

MthSc 119 – Test #2 Outline

1. Equivalence Relations

1. examples: modular arithmetic, subsets
2. reflexive, symmetric, transitive
3. partitions
4. equivalence classes
5. counting equivalence classes
 1. #subsets of a fixed size
 2. anagrams

2. Binomial Coefficients

1. $\binom{n}{k}$ = # k-element subsets of n-element set
2. properties
3. binomial theorem
4. Pascal's triangle, Pascal's identity
5. formula
6. applications: lottery, card hands
7. probability

3. Inclusion-Exclusion

1. $|A \cup B| = |A| + |B| - |A \cap B|$
2. extension to more than two sets
3. applications
4. derangements

4. Indirect Proofs

1. contrapositive
2. proof by contrapositive
3. proof by contradiction

5. Mathematical Induction

1. standard form
2. strong form
3. formulas (equalities) vs. inequalities
4. recursive definitions
5. Fibonacci sequence
6. applications