

# Counting, Probability & Statistics Syllabus

Instructor: Satvik Dasariraju

Weekly Classes on Sundays, 6:30-7:30 PM EST

## Course Description

This course will embark on a study of counting, probability, and statistics and will use a problem-based teaching approach that will include material from the Introduction and Intermediate Counting and Probability Texts from Art of Problem Solving. After starting with a foundation of counting methods, such as casework, complementary counting, and constructive methods, the course will then survey basic probability techniques. Other topics to be studied in detail include the principle of inclusion and exclusion, probability distributions, pigeonhole principle, combinatorial identities. The course will also examine statistics and its applications as related to counting and probability. Each class will be dedicated to student-selected problems from a section/chapter of the textbook, and the instructor will guide students through the plan of attack and execution for each problem. Students will have the opportunity to choose specific topics or challenge problems, which will determine the instructor's lesson plan. Counting, Probability & Statistics with Alphasademic will be a fantastic course for students looking to excel in advanced MathCounts, AMC 8, 10, and 12, and other math competitions.

## Meeting Agenda

1/30 Meeting 1: Introduction to Course and Basic Counting Methods

2/6 Meeting 2: Casework

2/13 Meeting 3: Complementary Counting

2/20 Meeting 4: Permutations & Combinations

2/27 Meeting 5: Introduction to Probability

3/6 Meeting 6: Geometric Probability

3/13 Meeting 7: Binomial Theorem

3/20 Meeting 8: Principle of Inclusion and Exclusion

3/27 Meeting 9: 1-1 Correspondence

4/3 Meeting 10: The Pigeonhole Principle

4/10 Meeting 11: Recursion

4/17 Meeting 12: Conditional Probability

4/24 Meeting 13: Probability Distributions

5/1 Meeting 14: Expected Value

5/8 Meeting 15: Introduction to Statistics

5/15 Meeting 16: Review