

Probability & Statistics, Part 1

Course Outline & Objectives

Course Description:

In Probability & Statistics, Part 1, students develop foundational skills in collecting, organizing, analyzing, and interpreting data. They learn to summarize datasets using tables, graphs, and numerical measures, investigate relationships between variables through scatter plots and correlation, and apply statistical reasoning to real-world situations. Students are introduced to probability concepts, including simple and compound events, conditional probability, and probability models. The course also explores counting techniques, such as permutations and combinations, and uses simulations to model random events and estimate probabilities.

Credits - One Semester (0.5 Carnegie unit / CA: 5 credits)

Prerequisites: Algebra 1, Geometry, and Algebra 2 (recommended)

OR Integrated Math 1, Integrated Math 2, and Integrated Math 3 (recommended)

Course Outline

Unit 1: Intro to Statistics and Data

- 1.1 Statistics Vocabulary
- 1.2 Organizing Data
- 1.3 Measures of Central Tendency
- 1.4 Measures of Spread

Unit 2: Displaying and Interpreting Data

- 2.1 Data Displays
- 2.2 Identifying Outliers and Cluster
- 2.3 Correlation vs Causation
- 2.4 Line of Best Fit
- 2.5 Correlation Coefficient

Unit 3: Probability Fundamentals

- 3.1 Sample Space and Event Notation
- 3.2 Theoretical vs Experimental Probability
- 3.3 Simple and Compound Events
- 3.4 Addition Rule
- 3.5 Multiplication Rule

Common Core Standards

In Unit 1 students will:

Distinguish between a population and a sample.
Identify variables as qualitative or quantitative and discrete or continuous.
Organize data into frequency tables and relative frequency tables.
Calculate and interpret mean, median, mode, range, variance, and standard deviation.
[S-ID.A.1–4]

In Unit 2 students will:

Create and interpret stem-and-leaf plots and box plots.
Identify and describe the importance of outliers and clusters.
Make and interpret scatter plots.
Explain correlation vs causation.
Calculate a trend line/line of best fit.
Calculate correlation coefficients.
[S-ID.A.1–4, S-ID.B.5–6]

In Unit 3 students will:

Explore sample spaces and probability notation.
Differentiate between and solve problems about Theoretical and Experimental Probability.
Find probabilities of simple, compound, independent, and dependent events.
Define and apply the probability addition rule and the probability multiplication rule.
[S-CP.A.1–5]

Course Outline

Unit 4: Advanced Probability Applications

- 4.1 Two Way Frequency Tables and Conditional Probability
- 4.2 Venn Diagrams
- 4.3 Tree Diagrams and Probability Models
- 4.4 Geometric Probability

Unit 5: Counting and Randomness

- 5.1 Factorials and Fundamental Counting Principle
- 5.2 Permutations vs Combinations
- 5.3 Randomization and Simulation

Common Core Standards

In Unit 4 students will:

Interpret and use two-way frequency tables.
Calculate conditional probabilities.
Use Venn diagrams, tree diagrams, and geometric probability models to solve problems.
Apply probability to real-world situations.

[S-CP.A.1–5, S-CP.B.6–9]

In Unit 5 students will:

Calculate factorials and apply the Fundamental Counting Principle.
Distinguish between permutations and combinations.
Calculate probabilities using permutations and combinations.
Simulate random events to estimate probabilities.

[S-CP.B.9, S-MD.A.1–4]