



## Advanced Probability and Statistics 7-9 Online Syllabus

### Course Goals

#### 1 Graphical Flexibility

Students see comparisons between different ways of expressing data visually. Students become comfortable expressing data in different ways.

#### 2 Regression Comparison

Students learn about different types of regression and consider which type of regression is appropriate for given situations.

#### 3 Introduction to Advanced Counting Techniques

Students begin to consider the differences between permutations, combinations, and other counting techniques for quickly determining large numbers of possible outcomes.

#### 4 Accelerated Content

Students are exposed to content above their grade-level.

### Course Topics

#### 1 Data Analysis

Students compare and analyze the use of histograms, stem-and-leaf plots, line plots, circle graphs, boxplots (box-and-whisker plots), and scatter plots to different scenarios.

#### 2 Linear Regression

Students learn about linear lines-of-best fit, how to determine one from data using Desmos graphing software, and practice using real-life problems.

#### 3 Quadratic Regression

Students learn about quadratic lines-of-best fit, how to determine one from data using Desmos graphing software, and practice using real-life problems.

#### 4 Exponential Regression

Students learn about exponential lines-of-best fit, how to determine one from data using Desmos graphing software, and practice using real-life problems.

#### 5 Which Regression is Best

Students analyze different scenarios and determine which type of regression is best represents a situation.

#### 6 Direct and Inverse Variation

This topic falls under the Algebra 1 and Algebra 2 Virginia SOLs' probability and statistics domain. Students learn about direct and inverse variation and apply the topic to algorithmic and real-life oriented problems.

#### 7 Simple Probability

Students review the definition of probability and apply it to solving simple probability questions.

#### 8 Dependent and Independent Events

Students learn the difference between a dependent and an independent event. They apply this knowledge to real-world practice

problems.

### **9 Counting Techniques**

Students use counting techniques such as making a list, drawing a tree diagram, permutations, and combinations to count the number of possible outcomes.

### **10 Probability Word Problems**

Students apply their knowledge of probability and counting techniques to solve real-world probability word problems.

### **11 The Standard Curve**

Students are introduced to the Standard Curve, Standard Deviation, and the 68-95-99.7 rule. Students use this information to find answers to real-world problems. Students also review the definitions of mean, median, and mode.

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