



STAFFORD COUNTY PUBLIC SCHOOLS

Curriculum Overview Statistics/Probability with Discrete Topics

Course Description:

Statistics and Probability is designed to include a study of the theory of probability at an applied level, descriptive statistics, and the use of statistical inference. Discrete Topics is a study of problem solving based on counting techniques. The course is designed for students who plan to enter such fields as business, education, economics, computers, psychology, sociology, medicine, etc., which require the organization and the interpretation of data to be successful in their jobs. The course will also provide a fundamental background for those students who plan careers in engineering, mathematics, or the sciences. There is no Standards of Learning test for this course.

Essential Skills/Processes:

In this course students will study descriptive statistics, probability theory, inferential statistics, and selected discrete topics. The course is designed for students who plan to enter such fields as business, education, economics, computers, psychology, sociology, medicine, etc., which require the organization and the interpretation of data to be successful in their jobs. The course will also provide a fundamental background for those students who plan careers in engineering, mathematics, or the sciences.

Important components of the course include the use of technology, projects and laboratories, cooperative group problem solving, and writing, as a part of concept-oriented instruction and assessment. Technology is an important tool in both learning mathematics and solving problems in mathematics. To use technology appropriately and effectively students must know the basic facts, understand concepts, and be able to estimate and reason logically.

Essential Knowledge:

- Distinguish the differences between qualitative and quantitative data, discrete and continuous variables, and levels of measurement: nominal, ordinal, interval, and ratio.
- Analyze graphical displays of data; including dotplots, stemplots, and histograms to identify and describe patterns and departures from patterns utilizing central tendency, spread, clusters, gaps, and outliers. Appropriate technology will be used to create graphical displays.
- Analyze numerical characteristics of univariate data sets to describe patterns and departure from patterns utilizing mean, median, mode, variance, standard deviation, interquartile range, and range. Appropriate technology will be used to calculate statistics.
- Analyze scatterplots to identify and describe the relationship between two variables using shape, strength of relationship, clusters, positive, negative, or no association, outliers and influential points. Appropriate technology will be used to generate scatterplots and to identify outliers and influential points.
- Describe the methods of data collection in a census, sample survey, experiment, and observational study and identify an appropriate method for a given problem setting.
- Compute and distinguish between permutations and combinations and use technology for applications.
- Develop, interpret, and apply the binomial probability distribution for discrete random variables, including computing the mean and standard deviation for the binomial variable.
- Identify random variables as independent or dependent and find the mean and standard deviations for sums and differences of independent random variables.

- Identify properties of a normal distribution and use a table or graphing calculator to apply the normal distribution to determine probabilities.
- Apply and interpret the logic of an hypothesis testing procedure. Tests will include large sample test for proportion, mean, difference between two proportions, difference between two means (independent and paired) and Chi-square test for goodness of fit, homogeneity of proportions, and independence.
- Identify the meaning of sampling distribution with reference to random variable, sampling statistic, and parameter and explain the Central Limit Theorem. This will include sampling distribution of a sample proportion, a sample mean, a difference between two sample proportions, and a difference between two sample means.

Resources:

- Stafford County Public Schools: <http://stafford.schoolfusion.us/> .
- High School Course Catalog: <http://stafford.schoolfusion.us/> . Click on “For Parents/Students” tab.
- VA Mathematics Standards of Learning:
http://www.doe.virginia.gov/testing/sol/standards_docs/mathematics/review.shtml
- School Report Card (VA Department of Education):
http://www.doe.virginia.gov/statistics_reports/school_report_card/index.shtml