

Grand Island Public Schools

PROBABILITY AND STATISTICS

Course Length: Two semesters

Grade Levels: 11, 12

Prerequisite Courses: Algebra 3-4

Course Description:

This course will provide an in-depth study of statistical concepts and techniques needed to organize, measure, and evaluate data. Students will use probability concepts to make informed decisions in such areas as health care, business and economics, the social and physical sciences, engineering, education, and leisure activities.

Probability and Statistics Course Standards

As a result of their participation in this course, students will:

Strand 1: Communicating Mathematical Thinking

- Build new mathematical knowledge through problem solving. (Problem Solving)
- Apply and adapt a variety of appropriate strategies to solve problems. (Problem Solving)
- Recognize and use connections among mathematical ideas and/or apply in contexts outside of mathematics. (Connections)
- Investigate, develop, and evaluate mathematical arguments and proofs. (Reasoning and Proof)
- Select, apply, and move fluently among mathematical representations to solve problems. (Representation)

Strand 2: Number and Operations

- Categorize random variables as either discrete or continuous.
- Use the addition rules for probability to solve problems (mutually exclusive events and events that are not mutually exclusive).
- Use the multiplication rules for probability to solve problems (independent events as well as dependent events).

Strand 3: Algebraic Concepts

- Determine if a given function is a "probability function".
- Calculate sample variance and standard normal distribution of sample data using formulas for both singular data and data in frequency distribution form.
- Use the binomial probability function and/or the B.P.F. tables to calculate probabilities for a binomial experiment.
- Calculate the linear correlation coefficient and linear regression equation for sample bivariate data.

Strand 4: Geometry, Spatial Concepts, and Measurement

- Calculate measures of central tendency (mean, median, mode, and midrange) and use these measures to analyze sample data.
- That is in singular form or in frequency distribution form.
- Use measures of dispersion (range, sample variance, and sample standard deviation) to analyze sample data that is both in singular form or in frequency distribution form.
- Calculate measures of position (high, low, quartiles, percentiles, and z-scores or standard scores) and use these measures to analyze sample data that is both in singular form or in frequency distribution form.
- Graph linear regression equations and interpret the meaning of the slope, y-intercept, and individual data points in the context of the sample data.
- Recognize the following types of frequency distributions: normal, uniform (or rectangular), skewed (to the right or left), J-shaped, and bimodal.
- Describe the properties of the standard normal distribution.

Strand 5: Data Analysis, Probability, and Statistics

- Identify the following statistical terms in given data-gathering events: experiment, population, sample, variable, data, statistic, and parameter.
- Compare and contrast the following: population and sample, data and variable, attribute (qualitative) variable and numerical (quantitative) variable.
- Make and use stem-and-leaf displays and frequency histograms to aid in the analysis of data.
- Determine and explain how statistical deception was used in various examples of statistical misrepresentation.
- Use the properties of a binomial probability distribution to determine if a probability distribution is binomial.