



RADNOR TOWNSHIP SCHOOL DISTRICT
Course Overview
Statistics
05040472



General Information

Prerequisite: Advanced Algebra 2 /Trigonometry
Length: Full Year
Format: Meets daily for one period

Course Description

Statistics allows students to pursue rigorous coursework that is aligned with *Pennsylvania Common Core State Standards* (CCSS). Students are admitted to this course based on criteria that consider past performance and demonstrated readiness. This college preparatory course aims to develop higher order thinking skills, using appropriate pace and content. This statistics course has a challenging workload that involves reading, writing, problem solving, and critical thinking, developing independence both inside and outside the classroom.

The major themes of statistics – describing data through graphical and numerical methods, sampling, anticipating patterns and statistical inference – are explored, along with the basic concepts of probability.

Course Objectives:

Introduction to Statistics

- Identify a population, sample, parameter or statistic.
- Identify different types of data.
- Identify different levels of measurement
- Discuss and indentify abuses of statistics.
- Identify different types of experimental designs.

Describing, Exploring and Comparing Data

- Construct a complete frequency table from a set of data.
- Convert a frequency table into a cumulative and or relative frequency table.
- Construct and interpret (by hand and with calculator) from data and summary statistics graphical displays of data: histogram, frequency polygon, ogive, dotplots, stemplots, Pareto charts, pie charts, box plots.
- Compute and Interpret: arithmetic mean, median, mode, midrange, standard deviation, range, variance, z-scores, quartiles, percentiles, deciles, outliers using 1.5 IQR method and 5-number summaries.

Fundamentals of Probability

- list a sample space
- compute simple probabilities
- determine odds in favor of and against an event
- compute probabilities using the addition rule
- compute probabilities using the multiplication rule
- identify independent/dependent events
- compute conditional probability
- test for independence using conditional probability
- compute probability of "at least one" using conditional probability

Probability Distributions

- verify valid probability distributions
- create probability histograms
- compute mean of expected value, variance, standard deviation of a probability distribution
- determine if outcomes are "unusual"
- determine if an event is binomial
- compute probability of binomial events using the formula and technology

Normal Probability Distributions

- compute probability based on a given z-score and direction
- determine a z-score to a corresponding probability
- given data and an event, compute probabilities using z-scores and normal distributions
- given a percentage of probability, find its corresponding value using z-score and normal distribution
- compute standard error
- compute sample mean
- compute probability of an event using the Central Limit Theorem
- compute value using Central Limit Theorem
- determine Rare Event Rule

Confidence Intervals (Large and Small), Finding the Sample Size, and Proportions

- determine critical value for a given level of confidence
- compute margin of error
- create confidence interval
- find point estimate and/or margin of error given a confidence interval
- interpret a confidence interval
- compare t- and normal distributions
- compute sample size for a given situation
- compute p-hat given x and y

Hypothesis Testing

- write null and alternative hypotheses from a claim
- compute a test statistic
- state conclusions from a test
- identify Type I and Type II errors
- test claims using the p-value method
- write null and alternative hypotheses from a claim
- compute a test statistic
- state conclusions from a test
- determine the appropriate method to test claims using the p-value method

Correlation and Residuals, including hypothesis testing

- construct and interpret scatter plots based on form, direction, and shape
- compute r given data
- match r values with certain graphs
- interpret r^2
- determine least squares regression line
- predict (\hat{y}) using least squares regression line
- identify and interpret influential points and outliers
- identify relationships between explanatory/response variables and confounded or affected by another variable
- create and interpret residual plots identify discrete and continuous random variables

Chi Square Testing

- compute observed and expected values
- compute Chi-square statistic value

- perform goodness-of-fit test
- perform test of independence

Common Assessments:

Common Course Assessments:

Common Midterm and Common Final

Major Units of Study:

Units of study are organized in a manner that encourages students to make connections across complex skills, strategies, and content.

Unit One: Introduction to Statistics

Unit Two: Describing, Exploring, and Comparing Data

Unit Three: Fundamentals of Probability

Unit Four: Probability Distributions

Unit Five: The Normal Distribution

Unit Six: Confidence Intervals

Unit Seven: Hypothesis Testing

Unit Eight: Inference About Two Means

Unit Nine: Correlation and Regression

Unit Ten: Chi Square

Materials & Texts

Common Texts and Resources:

Essentials of Statistics by Mario F. Triola, Peason Education, Inc. 2002