

FUNCTIONS & TRIGONOMETRY

Learning Targets

This is a one-semester course geared towards seniors who plan on taking college-level mathematics. The emphasis is on strengthening algebraic and reasoning skills and preparing the student to work with higher-level abstract mathematics.

ALGEBRA REVIEW

- Solve equation systems graphically and algebraically.
- Write linear functions in slope-intercept, point-slope and standard forms.
- Solve systems of inequalities graphically and algebraically.

GENERAL FUNCTIONS

- Process functional notation.
- Write the domain and range of various functions using interval notation.
- Process and sketch piece-wise functions.
- Analyze and process the “difference-quotient” of functions.
- Optimize a function graphically.

QUADRATIC FUNCTIONS

- Apply the “completing the square” technique.
- Switch between the transformation form, vertex form and polynomial form.
- Sketch a quadratic function.
- Use “real-world” quadratic functions.

COMPOSITION OF FUNCTIONS

- Process the composition of two or more functions.
- Prove a composition.
- Apply compositions to practical problems.

CALCULUS OF FUNCTIONS

- Calculate the instantaneous rate of change of any function.
- Apply the instantaneous rate of change.
- Calculate, graph and validate the inverse of any function.
- Analyze an “odd” versus “even” function.

RATIONAL FUNCTIONS

- Factor and simplify a rational function.
- Divide one algebraic function by another using synthetic and long division.
- Completely sketch a rational function.

POLYNOMIAL FUNCTIONS

- Factor using the “Factor Theorem”.
- Identify its multiplicity and end-behavior.

EXPONENTIAL FUNCTIONS

- Simplify expressions with exponents by using exponential properties.
- Apply exponential properties in problems involving compound interest and exponential growth and decay.
- Analyze expressions with logarithms and solve equations using logarithmic properties.

TRIGONOMETRIC FUNCTIONS

- Apply right-triangle trigonometric concepts.
- Distinguish between degree and radian measure.
- Use the idea that trigonometry is the mathematics of repetitive functions.
- Verify trigonometric identities.
- Analyze and sketch sinusoidal functions.
- Solve basic trigonometric equations.

STATISTICS

Learning Targets

This is a one-semester elective course offered as a follow-up to Functions & Trigonometry and geared towards seniors who may be considering taking statistics in college. College-level statistics can be highly theoretical and fast-paced, so the intent of this course is to equip the student with some fundamental statistical concepts and provide an insight into their applications. The use of graphing calculators and the statistical software, MINITAB, is woven into the course content.

DESCRIPTIVE STATISTICS

- Make distinctions between various forms of statistical variables.
- Describe qualitative data using pie charts, bar graphs and pareto diagrams.
- Describe quantitative data using stem-and-leaf plots, histograms and ogives.
- Calculate summaries of quantitative data such as mean, median, mode and standard deviation.
- Calculate similar summaries of grouped data.
- Analyze bivariate data using linear regression.

PROBABILITY THEORY

- Understand the various rules of probability.
- Distinguish between mutually exclusive and independent events when computing their probabilities.
- Use tree diagrams to distinguish between the addition and multiplication rules of probability.
- Understand the concept of a binomial probability distribution.
- Apply the rules of probability to such a distribution.

INFERENCEAL STATISTICS

- Understand the concept of a normal distribution.
- Apply normal distribution concepts to real-life data.
- Understand the central limit theorem and the use of a sampling distribution.
- Estimate the mean of a population using confidence intervals.
- Use two forms of hypothesis tests to hypothesize about the mean of a population.