STATISTICS / TRIGONOMETRY
1 Unit

I. SPECIFIC COURSE OBJECTIVES

A. At the completion of this course, the student will
1. be able to determine the meaning and value of statistics that he or she will encounter in everyday life.
2. be prepared to continue studies in mathematics
3. recognize the use of trigonometry in different real world situations

II. SPECIFIC COURSE OUTLINE OF COURSE CONTENT

A. Making sense of data Standard (9-12.S.1.2A)

1. Collecting data
2. Tables and graphs
3. Other displays
4. Measures of centers
5. Quartiles, percentiles, and box plots
6. Histograms
7. Variance and standard deviation
8. Who wrote the *Federalist* papers?

B. Functions and models 9-12.A3.1A . 9-12A 3.2A . 9-12. S. 1.5A

1. The language of functions
2. Linear models
3. The line of best fit
4. Step functions
5. Correlation
6. Quadratic models
7. Finding quadratic models
8. The men's mile record

C. Transformations of functions and data 9-12.A.4.3A

1. The graph translation theorem
2. Translations of data
3. Symmetries of graphs
4. The graph scale change theorem
5. Scale changes of data
6. Composition of functions
7. Inverse functions

D. Power, exponential, and logarithmic functions 9-12. A.4.4A, 9-12. A. 3.1A

1. *n*th root functions
2. Rational power functions
3. Exponential functions
4. Finding exponential models
5. Logarithmic functions
6. e and natural logarithms
7. Properties of logarithms
8. Solving exponential equations
9. Exponential and logarithmic modeling

E. Trigonometric functions 9-12. G.1.2A

1. Measures of angles and rotations
2. Lengths of arcs and areas of sectors
3. Trigonometric ratios of acute angles
4. The sine, cosine, and tangent functions
5. Exact values of trigonometric functions
6. Graphs of sine, cosine, and tangent functions
7. Properties of sines, cosines, and tangents
8. The law of cosines
9. The law of sines

F. Probability and simulation 9-12. S.2.1A . 9-12. S.2.2A

1. Fundamental properties of probability
2. Addition counting principles
3. Multiplication counting principles
4. Independent events
5. Permutations
6. Probability distributions
7. Random numbers
8. Monte Carlo methods

G. Sequences, series, and combinations 9-12. A.3.3A

1. Formulas for sequences
2. Limits of sequences
3. Arithmetic Series
4. Geometric Series
5. Infinite Series
6. Combinations
7. Pascal's triangle
8. The binomial theorem
9. Binomial probabilities

10. Quality control by sampling

H. Polynomial functions 9-12 .A.1.2A

1. Polynomial models
2. Finding polynomial models
3. Graphs of polynomial functions
4. Division and the remainder theorem
5. The factor theorem
6. Complex numbers
7. The fundamental theorem of algebra
8. Factoring sums and differences of powers
9. Advanced factoring techniques
10. Roots and coefficients of polynomials

I. Binomial and normal distributions 9-12.S.1.4A, 9-12.S.2.3A

1. Binomial probability distributions
2. Mean and standard deviation of a binomial distribution
3. Representing probabilities by areas
4. The parent of the normal curve
5. The standard normal distribution
6. Other normal distributions
7. Using probability to make judgments
8. Sampling distributions and the central limit theorem
9. Confidence and caution in statistical reasoning

III. PLAN FOR STUDENT EVALUATION

A. Daily work will be graded
B. Quizzes will be given at the rate of one to two per chapter
C. A test will be given at the end of each chapter

IV. SPECIFIC STANDARDS FOR PASSING

A. The student will accomplish passing work (60% accuracy) in the following areas:

1. Calculating measures of center and spread for data sets
2. Describing relations between measures of center or measures of spread
3. Reading and interpreting bar graphs, circle graphs, coordinate graphs, box plots, and histograms
4. Finding and interpreting linear and quadratic models
5. Using scatter plots to draw conclusions about models for data

6. Describing the effects of translations or scale changes on functions and their graphs
7. Describing the symmetries of graphs
8. Evaluating logarithms
9. Using exponential models to solve problems
10. Converting between degrees, radians, and revolutions
11. Solving problems involving sines, cosines, or tangents
12. Solving problems involving lengths of arcs or areas of sectors
13. Computing probabilities
14. Solving equations using factorials
15. Constructing, graphing, and interpreting probability distributions
16. Finding the sum of terms in a sequence
17. Using sequences and series to solve problems
18. Factoring polynomials and solve polynomial equations using the Factor Theorem, sums or differences of powers, grouping terms, or trial and error
19. Constructing and interpreting polynomials that model real world situations
20. Calculating the mean and standard deviation of a binomial probability distribution
21. Solving probability problems using binomial or normal distributions