Curriculum Document for Mathematics
Course Title: Topics in Advanced Math   **Grade: 9-12**

Learner Objective #1: **Students will use correct vocabulary, logical reasoning skills, and appropriate technology and methods to solve problems.**

- Identify the independent variables, domain and range of a function.
- Recognize parent functions and their graphs.
- Identify the types of transformations being applied to graphs.
- Convert between degrees, radians, and revolutions.
- Apply definitions of sine, cosine and tangent functions.
- Identify amplitude, period, frequency, phase shift of circular functions.
- Identify between independent and dependent events in probability.
- Identify events to be mutually exclusive, complementary or neither.

Learner Objective #2: **Students will effectively use numbers for, measuring, estimating, and problem solving.**

Learner Objective #3: **Students will use geometric concepts and relationships to interpret, represent, and solve problems.**

- Describe the effects of translations and scale changes to the graphs.
- Describe the symmetry of graphs.
- Compute lengths of circular arcs and areas of sectors.
- Use sine, cosine, tangent to solve right triangle problems
- Evaluate inverse trig functions.

Learner Objective #4: **Students will use appropriate tools to measure accurately. Students will use measurements in problem-solving situations.**

- Create a slide rule using ruler and the natural logs.

Learner Objective #5: **Students will use data, statistics, and appropriate technology in problem-solving situations.**

- Collect, organize, evaluate data to and from tables and graphs
- Define, design, and analyze the following different types of statistical graphs
- Use samples to make inferences about populations
- Calculate measures of centers and spread for data sets.
- Identify properties of regression lines and correlation coefficient.
- Use scatterplots to draw conclusions about models for data.
- Apply transformations to given data.
- Compute z-scores for given data.
- Model data using linear, exponential, quadratic models.
- Model data using circular models.
- Setup and run simulations using technology and non-technology methods.

Learner Objective #6: **Students will use algebraic techniques to define and solve problems.**

- Use sigma-notation to represent a sum, mean, variance or standard deviation.
- Evaluate functions described with Euler's notation.
- Determine the equation of the function given the transformation.
- Find, interpret and graph linear, exponential, quadratic models.
- Use step functions to model situations.
- Find formulas and values of composites of functions.
- Find and graph inverses of functions.
- Find, interpret and graph circular models.
- Use Law of Sines and Law of Cosines, and related theorems.
- Solve exponential and logarithmic equations.
- Use properties of logarithms.
- Use properties of nth roots.
- Find, interpret and graph exponential and logarithmic models.
- Use properties to find probability.
- Use permutations and combinations to find probability.
- Evaluate arithmetic, geometric, polynomial sequences and series.
- Reproduce and apply Pascal's triangle.
- Use the Binomial Theorem to expand polynomials and compute probability.