Curriculum Document for Mathematics

Course Title: Algebra 2   **Grade: 9-12**

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

- Identify if number belongs to which sets.
- Analyze and solve story problems.
- State domain and range of a relation.
- Determine if relation is function by definition and Vertical Line Test.
- Identify if equation is linear, quadratic or absolute value.
- Recognize and compute step functions.
- Identify dimensions of matrices and realize when two matrices can be added or multiplied together.
- Rewrite radicals as fractional powers, and vice versa.
- Identify the conic sections.
- Recognize asymptotes of functions.
- Rewrite exponential equations as logarithmic, and vice versa.
- Compute using sigma-notation.

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.

- Determine slope and intercepts of lines.
- Determine if two lines are parallel, perpendicular or neither.
- Find the distance between two points.
- Graph the conic sections: parabola, ellipse, hyperbola, circle.
- Use the properties of the conic sections.

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

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.

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

- Evaluate functions described with Euler's notation.
- Find, interpret and graph linear models.
- Write equations in standard or slope-intercept form given different information about the line.
- Solve "n" equations and inequalities given "n" unknowns using graphing, substitution, elimination and Cramer's Rule methods.
- Use linear programming to solve problems.
- Find determinants for square matrices.
- Use properties of matrices.
- Add, subtract, multiply and divide polynomials.
- Factor 2nd degree and certain 3rd degree polynomials
- Simplify radicals.
- Solve nth root equations.
- Add, subtract, multiply and divide complex numbers.
- Solve quadratic equations using graphing, factoring, completing the square, and the quadratic formula.
- Solve other nonquadratic equations that can be written in quadratic form.
- Write equations of the conic sections, and use to solve problems.
- Evaluate and find zeros of polynomial functions.
- Find formulas and values of composites of functions.
- Find and graph inverses of functions.
- Solve problems using direct, inverse and joint variation.
- Simplify rational expressions.

- Simplify complex fractions.
- Simplify exponential and logarithmic expressions using their properties.
- Solve and graph exponential and logarithmic equations.
- Evaluate arithmetic and geometric sequences and series.
- Reproduce and apply Pascal's triangle to the Binomial Theorem.