# Algebra II

**Grades:** 9-12  
**Length:** Year  
**Prerequisites:** Geometry  
**Special Requirements:** Graphing calculator  
*TI-84 (preferred) or TI-83 (acceptable)*

## Competency Goal 1:
The learner will perform operations with matrices and polynomials.

| 1.01 | Simplify and perform operations with rational expressions.  
|      | • add, subtract, multiply and divide rational expressions  
|      | • compute greatest common factor and least common multiple  
|      | • simplify complex fractions |

| 1.02 | Simplify and perform operations with exponential and logarithmic expressions.  
|      | • express nth roots using rational exponents and radical notation  
|      | • evaluate rational expressions  
|      | • convert between logarithmic form and exponential form  
|      | • evaluate logarithmic expressions  
|      | • apply the change of base formula to evaluate logs of any base |

Adopted by the Board on Jan 30, 2007
- condense, expand and simplify logarithmic expressions

1.03 Simplify and perform operations with polynomial expressions and equations.
- add, subtract, multiply and divide polynomial expressions
- evaluate polynomial expressions
- factor polynomial expressions
- find the prime factorization of integers
- determine the nature of the roots of a quadratic using the discriminant

1.04 Simplify and perform operations with matrices.
- identify rows, columns, elements and dimensions of a matrix
- add, subtract and multiply matrices
- multiply a matrix by a scalar
- solve for missing elements when given equal matrices
- calculate the determinant for 2x2 and 3x3 matrices
- calculate the inverse of a 2 x 2 matrix

**Competency Goal 2:**
The learner will use relations and functions to solve problems.

2.01 Use the composition and inverse of functions to model and solve problems; justify results.

2.02 Use linear functions and inequalities to model and solve problems; justify results.
- solve using tables, graphs, and algebraic properties
- interpret the constants and coefficients in the context of the problem
- graph linear equations and inequalities in two variables
- collect and analyze data from real world situations
- create and use linear best-fit models with data
- check linear models for goodness-of-fit and use the model, where appropriate, to draw conclusions or make predictions

2.03 Use absolute value, quadratic, cubic, rational, exponential and radical equations to model and solve problems; justify results.
- solve using tables, graphs, and algebraic properties
- interpret the constants and coefficients of an equation in the context of the problem
- graph functions to solve real life problems

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Competency Goal 3:
The learner will solve algebraic equations.

3.01 Solve linear equations and inequalities in one and two variables.
   • graph real number solutions to inequalities on a number line (one variable) or on the coordinate plane (two variable)

3.02 Solve absolute value equations and inequalities.
   • graph real numbers solutions to inequalities on a number line

3.03 Solve polynomial equations and inequalities.
   • solve quadratic equations by graphing, factoring, using square roots, completing the square and using the quadratic formula
   • solve quadratic inequalities in two variables and graph the solution set on the coordinate plane
   • solve higher order polynomial equations by factoring and using the zero product property

3.04 Solve radical equations.

3.05 Solve exponential and logarithmic equations.

3.06 Solve rational equations.

3.07 Solve systems of linear and quadratic equations and inequalities in two or three variables.
   • solve by graphing, substitution, linear combination, and matrix operations
   • graph the solution set to a system of inequalities on the coordinate plane

Algebra 2
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