

**College Algebra Content Learning Outcomes  
From April 2014 Fac2Fac Conference**

**Learning Outcome 1**

**Introductory algebra and problem solving**

*Students should be able to:*

- Evaluate expressions involving addition, subtraction, multiplication and division of signed numbers.
- Simplify expressions using the order of operations.
- Evaluate expressions involving absolute value and variables for given values of the variables.
- Apply the laws of exponents to simplify expressions involving integer exponents.
- Solve linear equations with one unknown variable.
- Solve linear equations with more than one unknown for the specified variable.
- Write a linear equation that models a word problem.
- Apply formulas for circumference and area of circles.
- Apply formulas for perimeter and area of rectangles and triangles.
- Apply formulas for volume of rectangular solids

**Learning Outcome 2**

**Functions, graphing linear equations and inequalities**

*Students should be able to:*

- Graph linear equations and inequalities with two variables.
- Determine the x and y-intercepts of a linear equation.
- Given a table of values that defines a relation, determine if the relation is a function
- Given an algebraic equation that defines a relation, determine if the relation is a function.
- Given a graph that defines a relation, determine if the relation is a function.
- Given a written description that defines a relation, determine if the relation is a function.
- Determine the slope of a line between two given points.
- Determine if two lines are parallel or perpendicular by their slopes.
- Use function notation to evaluate functions for inputs in their domains. Interpret statements that use function notation in terms of a context
- Determine the range and domain of relations and functions.
- Determine the equation of a line.
- Determine the equation of a line that is parallel or perpendicular to a given line and passes through a given point.

**Learning Outcome 3**

**Systems of equations in two and three Variables**

*Students should be able to:*

- Solve a system of equations in two unknowns
- Solve word problems using systems of equations.

**Learning Outcome 4**

**Inequalities and absolute value**

*Students should be able to:*

- Solve linear inequalities and graph the solution set.
- Express an interval in set notation, interval notation, and as a graph on a number line.
- Express an interval in set notation, interval notation, and as a graph on a number line.
- Find the union and intersection of two sets.
- Solve compound inequalities and write the solution set as indicated.
- Solve equations and inequalities involving absolute value and write the solution set as indicated.

**Learning Outcome 5**

**Polynomials**

*Students should be able to:*

- Add, subtract, and multiply polynomials.
- Factor trinomials.

- Identify common factors in a polynomial.
- Solve quadratic equations by factoring.

## **Learning Outcome 6:**

### **Rational expressions**

*Students should be able to:*

- Determine the domain and range for rational functions.
- Simplify rational expressions.
- Add, subtract, multiply and divide rational expressions.
- Simplify rational expressions involving complex numbers.
- Solve equations involving rational expressions.
- Solve word problems using equations that include rational expressions.
- Divide polynomials.
- Solve for unknowns in formulas that contain rational expressions.

## **Learning Outcome 7**

### **Exponents and radicals**

*Students should be able to:*

- Write a radical expression in simplest form.
- Determine the domain for radical functions.
- Write radical expressions as an expression with a rational exponent and vice versa.
- Apply the laws of exponents to expressions with rational exponents.
- Simplify radical expressions using rational exponents and/or factoring.
- Add, subtract, multiply and divide radical expressions using radical properties and/or rational exponents.
- Solve equations involving radical expressions.
- Rationalize the denominators
- Determine the square roots of a negative number.
- Simplify powers of i
- Add, subtract, multiply and divide complex numbers in the form  $a + bi$ .

## **Learning Outcome 8**

### **Quadratic equations and functions**

*Students should be able to:*

- Solve quadratic equations by completing the square.
- Solve quadratic equations using the quadratic formula.
- Use the discriminant to determine the types of solutions of a quadratic equation.
- Graph quadratic functions.

## **Recommendations from the [Colorado Math Pathways Task Force](#) – May 2015**

Have students who intend to take Calculus I do so in their first year (may not work for every student)

- **CalcPath**

- Current course options:
  1. Go right into Calculus I
  2. Take Pre-Calculus and then Calculus I
  3. Follow the current sequence of College Algebra, Trigonometry, and Calculus I
- Potential support options to assist students in completing Calculus I in first year/first 30 credit hours
  1. Co-requisite instruction/support
  2. Stretch courses (the risk here is transferring before completing the entire course)
  3. Online support modules
  4. Compressed/accelerated module