University of Colorado Denver
Math 1070 Topics
Updated: Fall 2009

1. Solving Equations and Inequalities. (Some of this is review material which may be covered at a brisk pace.)
   Solve linear equations algebraically.
   Solve quadratic equations by factoring, square root method, completing the square, quadratic formula.
   Quadratic equations with complex solutions. (optional)
   Applications of linear and quadratic equations including business applications.
   Solve rational and radical equations algebraically.
   Solve linear inequalities algebraically and graphically.
   Solve quadratic, factored polynomial and rational inequalities.
   Solve absolute value equations and inequalities. (optional)

2. Graphs
   Plot points in Cartesian coordinate plane. (optional)
   Find distance between two points and midpoint of a line segment. (optional)
   Sketch a graph by plotting points. (optional)
   Find intercepts of linear and quadratic functions algebraically and graphically.
   Test an equation for symmetry with respect to the x-axis, y-axis and origin.
   Find an equation of a circle and graph a circle. (optional)
   Calculate and interpret slope of a line and write the equation of a line in slope-intercept form.
   Graph lines by hand given a point and the slope as well as graph lines written in general form.
   Find the equation of a line given a point and the slope of the line, or given two points on the line.
   Find the equation of vertical lines and horizontal lines.
   Find the equation of perpendicular lines and parallel lines.
   Draw and interpret scatter diagrams.
   Distinguish between linear and nonlinear relations.
   Use a graphing utility to find the line of best fit by linear regression.

3. Functions and Their Graphs
   Determine whether a relation represents a function.
   Evaluate functions.
   Evaluate the difference quotient where f is linear as well as quadratic.

   Find the domain of where f is a polynomial, rational or root function.
   Identify the graph of a function. Use the vertical-line test.
   Determine Even and Odd functions from a graph as well as from an equation.
   Use the graph of a function to determine where the function is increasing, decreasing or constant.
   Use the graph to locate local maxima and local minima
   Use a graphing utility to approximate local maxima and minima and to find increasing or decreasing intervals.
   Find the average rate of change of a function.

   Graph key functions "library of functions": , , , , , , , .
   Graph piecewise-defined functions by hand and with a graphing utility then evaluate.
   Transformations: vertical and horizontal shifts, vertical stretching & compressing, reflections about x-axis.
   Transformations: horizontal stretching & compressing, reflections about y-axis. (optional)
   Mathematical modeling: geometric problems, maximizing profit, minimizing cost, etc.
   Form the sum, difference, product and quotient of two functions.
   Form a composite function.
   Find the domain of a composite function.
   Determine whether a function is one-to-one.

Obtain the graph of the inverse function from the graph of the function.
Find the inverse of a function defined by an equation.

4. Quadratic and Polynomial Functions
   Graph quadratic functions using transformations.
   Graph a quadratic function by hand by finding its vertex, axis of symmetry and intercepts.
   Find the maximum or minimum value of a quadratic function by finding the vertex (without technology).
   Build quadratic models from verbal descriptions as well as from data with technology by quadratic regression.
   Solve quadratic inequalities graphically by hand and with a graphing utility.
   Identify polynomial functions and their degree.
   Identify the real zeros of a factored polynomial function and their multiplicity.
   Use the rational zeros theorem to list the potential rational zeros of a polynomial function.
   Find the rational zeros of a polynomial function by long division or synthetic division.
   Find the complex zeros of a polynomial function.

5. Rational Functions
   Determine end behavior, intercepts, turning points, domain/range and sketch the graph of a factored polynomial.
   Find the domain of a rational function.
   Find the vertical and horizontal asymptotes of a rational function.
   Find oblique asymptotes (optional).
   Analyze the graph of a rational function: find the domain, intercepts, asymptotes and graph by hand.
   Solve applied problems (business applications) involving rational functions.

6. Exponential and Logarithmic Functions
   Evaluate and graph exponential functions.
   Convert from exponential to logarithmic form and vice versa.
   Evaluate simple logarithmic expressions without a calculator.
   Determine the domain of a logarithmic function.
   Work with properties of logarithms.
   Use the change of base formula to evaluate logarithms.
   Solve logarithmic equations algebraically and graphically.
   Solve exponential equations algebraically and graphically.
   Solve applications involving exponential growth and decay including compound interest problems.

7. Sequences and Series
   Find specific and general terms in a sequence.
   Use factorial notation.
   Use summation notation to write partial sums of a series.
   Recognize and arithmetic sequence and find the sum of the first n terms. (optional)
   Recognize a geometric sequence and find the sum of a finite geometric sequence. (optional)
   Find the sum of an infinite geometric sequence. (optional)