Algebra 1 Fall Semester Objectives
(Subject to Change)

Mathematical Mindset
  A. Describe aspects of a mathematical mindset:
    1. Everyone can learn math to the highest levels
    2. Mistakes are valuable
    3. Questions are really important
    4. Math is about creativity and making sense
    5. Math is about connections and communicating
    6. Math class is about learning not performing
    7. Depth is more important than speed
  B. Describe pattern growth (in words, visually, in tables, in graphs, using algebraic expressions) and use pattern growth to make conjectures

Equations and Inequalities in One-Variable
  1. Add, subtract, and multiply polynomials.
  2. Write, solve, graph, and interpret the solution to a one-variable, linear equation
  3. Write, solve, graph, and interpret the solutions to a one-variable, linear inequality
  4. Write, solve, graph, and interpret the solutions to one-variable, linear, absolute value equations and inequalities.
  5. Solve a multi-variable equation for one of the variables

Two-Variable Quantitative Data and Linear Functions
  6. Write the equation of a line from: a graph, two points, point and slope, and situation.
  7. Display and describe the association between two variables:
      a. Create a scatter plot
      b. Describe the association (optional: correlation coefficient)
      c. Estimate the line of best fit for two variables
      d. Interpret the meaning of the y-intercept and slope of line of best fit
  8. Understand and apply residuals:
      a. Calculate residuals for a given set of data
      b. Interpret residuals in context
      c. Create a residual plot to assess whether a line of best fit is appropriate

Features of Functions
  9. Understand the relationship between a graph of a function and its key characteristics:
      a. Identify/describe the key characteristics of a relation (is it a function, family, x-intercept, y-intercept, symmetry, vertex, maximum/minimum point, intervals increasing/decreasing)
      b. Given key features, create a graph
  10. Domain and range of a graph and the quantitative relationship it describes (situations)
  11. Use function notation to evaluate inputs and/or outputs from different function representations (i.e. tables, graphs, equations and/or situations).
  12. Graph a new function: cube root, square root, piecewise, step, absolute value
  13. Find an inverse function (optional)

Systems of Equations/Inequalities
  14. Solve a system of linear equations using multiple methods (table, graph, equal values, substitution, elimination)
  15. Write a system of linear equations to model a situation, table, or graph.
  16. Write, solve, graph, and interpret the solutions to a system of two-variable inequalities. (linear, quadratic, and exponential)

Sequences
17. Write recursive equations and explicit equations for both arithmetic and geometric sequences from situations, tables, and graphs. Can also take a recursive equation and write the correct corresponding explicit equation (and vice versa)

18. Be able to use a recursive equation and an explicit equation to write out or graph the correct sequence.

19. Identify and explain if a situation is arithmetic (linear) or geometric (exponential) by using growth patterns in the given data.

Exponential Functions
20. Identify the key characteristics of an exponential function (growth, intercepts, family, multiplier, percent change, domain, range, and asymptote)
21. Rewrite and evaluate expressions involving radicals and fractional exponents using the properties of exponents (without a calculator).
22. Represent an exponential function as a graph, table, equation, and situation

Quadratic Functions
23. Identify the key characteristics of a quadratic function (x-intercepts, y-intercept, vertex, symmetry, growth, domain, range, and family)
24. Factor a polynomial
25. Solve a quadratic equation in multiple ways (Zero Product Property, graphing/tables, quadratic equation, square roots, and completing the square)
26. Graph a quadratic function
27. Represent a quadratic function in multiple ways (equation, table, graph, and word problem)

Comparing Linear, Quadratic, and Exponential Functions
28. Determine what family of functions is best used to model a functions given as a table, graph, equation, and/or situation.
29. Compare and contrast two functions