MATH 1310 College Algebra -- Objectives

Functions:

- Use and interpret functional notation.
- Find the domain of polynomial, rational, radical, exponential, and logarithmic functions.
- Find a symbolic representation of the sum, difference, product, quotient, and composition of two functions.
- Evaluate the sum, difference, product, quotient, and composition of two functions at a given value of the respective domain for functions represented symbolically, graphically, and numerically.
- Find the inverse of a function represented symbolically, graphically, or numerically.
- Interpret the graphs of functions.

Graphing functions:

- Sketch the graphs of the following basic functions:
  
  \[ f(x) = x \] – Identity function,
  
  \[ f(x) = |x| \] – Absolute Value function,
  
  \[ f(x) = x^2 \] – Square function,
  
  \[ f(x) = x^3 \] – Cube function,
  
  \[ f(x) = \sqrt{x} \] – Square Root function,
  
  \[ f(x) = \sqrt[3]{x} \] – Cube Root function,
  
  \[ f(x) = \frac{1}{x} \] – Reciprocal function,
  
  \[ f(x) = \frac{1}{x^2} \] – Reciprocal Square function,
  
  \[ f(x) = a^x \] – Exponential function,
  
  \[ f(x) = \log_a(x) \] – Logarithmic function,
• Sketch the graphs of general linear functions, quadratic functions, factored polynomial functions of degree 3 or more, exponential and/or logarithmic functions, and rigid transformations of all these functions!
• Describe the end behavior of polynomial functions
• Approximate the zeros of a function from its graph.
• Solve an inequality involving a function from its graph.
• Graph a piece-wise defined function.

Symbolic Adeptness:
• Solve polynomial, rational, exponential, and logarithmic equations symbolically.
• Solve equations involving radicals symbolically.
• Solve equations with rational exponents symbolically.
• Solve equations with negative exponents symbolically.
• Solve polynomial and rational inequalities symbolically.
• Use the Synthetic Division and the Remainder Theorem to find zeros of polynomials of degree three or greater.
• Find the vertex of a parabola by completing the square.
• Find the vertex of a parabola written in standard form by using the formula \( h = -b/2a \).
• Convert an exponential equation to logarithmic form, and a logarithmic equation to exponential form.
• Evaluate exponential and logarithmic functions using the change of base formula and a calculator.
• Use the properties of logarithms to expand a logarithmic expression, and to write an expanded logarithmic expression as a single logarithm.
• Solve a system of linear equations using Elimination/Substitution Method.

Applications
• Recognize and use applications of linear functions.
• Recognize and use applications of quadratic functions, including falling object problems and extremum problems.
• Recognize and use applications of exponential and logarithmic functions, including exponential growth and decay, doubling time, and half-life problems.
• Recognize and use applications of systems of linear equations.