

## 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:

$$f(x) = x - \text{Identity function,}$$

$$f(x) = |x| - \text{Absolute Value function,}$$

$$f(x) = x^2 - \text{Square function,}$$

$$f(x) = x^3 - \text{Cube function,}$$

$$f(x) = \sqrt{x} - \text{Square Root function,}$$

$$f(x) = \sqrt[3]{x} - \text{Cube Root function,}$$

$$f(x) = \frac{1}{x} - \text{Reciprocal function,}$$

$$f(x) = \frac{1}{x^2} - \text{Reciprocal Square function,}$$

$$f(x) = a^x - \text{Exponential function,}$$

$$f(x) = \log_a(x) - \text{Logarithmic function,}$$

- 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.