Calculus 1, Chapter 1 "Functions" Study Guide

Prepared by Dr. Robert Gardner

The following is a *brief* list of topics covered in Chapter 1 of *Thomas' Calculus* 14th edition.

1.1 Functions and Their Graphs. Function, independent variable, dependent variable, domain, range, vertical line test, graph, piecewise defined functions, greatest integer function $\lfloor x \rfloor$, least integer function $\lceil x \rceil$, increasing/decreasing functions, even/odd function, symmetry about the y-axis, symmetry about the origin, linear function, slope, power function, polynomial function (degree, coefficients), rational functions, algebraic/transcendental functions, exponential functions.

1.3 Trigonometric Functions. Radians, standard position of an angle, special angles and their trig functions, periodic function/period, graphs of the six trig functions, trig identities, sum and difference formulas, double angle formulas, half angle formulas, Law of Cosines, Law of Sines, general sine function (amplitude, period, horizontal shift, vertical shift).

1.5 Exponential Functions. Exponential function with base a, integer exponents/rational exponents/irrational exponents, Rules for Exponents (Theorem 1.5.A), natural exponential functions.

1.6 Inverse Functions and Logarithms. One-to-one function, horizontal line test, inverse function, finding an inverse function, logarithm function with base a, Algebraic Properties of the Natural Logarithm (Theorem 1.6.1), inverse properties of exponential and logarithmic functions, Change of Base Formula, restrictions of domains of trig functions to find inverses, inverse trig functions.