TOPIC: FUNCTIONS

ALGEBRA II
STANDARD AII.7

The student will investigate and analyze functions algebraically and graphically. Key concepts include

a) domain and range, including limited and discontinuous domains and ranges;
b) zeros;
c) *x*- and *y*-intercepts;
d) intervals in which a function is increasing or decreasing;
e) asymptotes;
f) end behavior;
g) inverse of a function; and
h) composition of multiple functions.

Graphing calculators will be used as a tool to assist in investigation of functions.

ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
• Functions may be used to model real-world situations. • The domain and range of a function may be restricted algebraically or by the real-world situation modeled by the function. • A function can be described on an interval as increasing, decreasing, or constant. • Asymptotes may describe both local and global behavior of functions. • End behavior describes a function as x approaches positive and negative infinity. • A zero of a function is a value of x that makes $f(x)$ equal zero.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** • Identify the domain, range, zeros, and intercepts of a function presented algebraically or graphically. • Describe restricted/discontinuous domains and ranges. • Given the graph of a function, identify intervals on which the function is increasing and decreasing. • Find the equations of vertical and horizontal asymptotes of functions. • Describe the end behavior of a function. • Find the inverse of a function. • Graph the inverse of a function as a reflection across the line $y = x$.

TOPIC: FUNCTIONS

ALGEBRA II
STANDARD AII.7

The student will investigate and analyze functions algebraically and graphically. Key concepts include

a) domain and range, including limited and discontinuous domains and ranges;
b) zeros;
c) *x*- and *y*-intercepts;
d) intervals in which a function is increasing or decreasing;
e) asymptotes;
f) end behavior;
g) inverse of a function; and
h) composition of multiple functions.

Graphing calculators will be used as a tool to assist in investigation of functions.

ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
• If (a, b) is an element of a function, then (b, a) is an element of the inverse of the function. • Exponential ($y = a^x$) and logarithmic ($y = \log_a x$) functions are inverses of each other. • Functions can be combined using composition of functions.	• Investigate exponential and logarithmic functions, using the graphing calculator. • Convert between logarithmic and exponential forms of an equation with bases consisting of natural numbers. • Find the composition of two functions. • Use composition of functions to verify two functions are inverses.