

CHAPTER 1 REVIEW

KEY TERMS

absolute value function $f(x) = \begin{cases} -x, & x < 0 \\ x, & x \geq 0 \end{cases}$

algebraic function a function involving any combination of only the basic operations of addition, subtraction, multiplication, division, powers, and roots applied to an input variable x

base the number b in the exponential function $f(x) = b^x$ and the logarithmic function $f(x) = \log_b x$

composite function given two functions f and g , a new function, denoted $g \circ f$, such that $(g \circ f)(x) = g(f(x))$

cubic function a polynomial of degree 3; that is, a function of the form $f(x) = ax^3 + bx^2 + cx + d$, where $a \neq 0$

decreasing on the interval I a function decreasing on the interval I if, for all $x_1, x_2 \in I$, $f(x_1) \geq f(x_2)$ if $x_1 < x_2$

degree for a polynomial function, the value of the largest exponent of any term

dependent variable the output variable for a function

domain the set of inputs for a function

even function a function is even if $f(-x) = f(x)$ for all x in the domain of f

exponent the value x in the expression b^x

function a set of inputs, a set of outputs, and a rule for mapping each input to exactly one output

graph of a function the set of points (x, y) such that x is in the domain of f and $y = f(x)$

horizontal line test a function f is one-to-one if and only if every horizontal line intersects the graph of f , at most, once

hyperbolic functions the functions denoted \sinh , \cosh , \tanh , csch , sech , and coth , which involve certain combinations of e^x and e^{-x}

increasing on the interval I a function increasing on the interval I if for all $x_1, x_2 \in I$, $f(x_1) \leq f(x_2)$ if $x_1 < x_2$

independent variable the input variable for a function

inverse function for a function f , the inverse function f^{-1} satisfies $f^{-1}(y) = x$ if $f(x) = y$

inverse hyperbolic functions the inverses of the hyperbolic functions where \cosh and sech are restricted to the domain $[0, \infty)$; each of these functions can be expressed in terms of a composition of the natural logarithm function and an algebraic function

inverse trigonometric functions the inverses of the trigonometric functions are defined on restricted domains where they are one-to-one functions

linear function a function that can be written in the form $f(x) = mx + b$

logarithmic function a function of the form $f(x) = \log_b(x)$ for some base $b > 0$, $b \neq 1$ such that $y = \log_b(x)$ if and only if $b^y = x$

mathematical model A method of simulating real-life situations with mathematical equations

natural exponential function the function $f(x) = e^x$