Properties of Radicals and Rational Exponents

Number of Real *n*th Roots (p. 414)	Let n be an integer greater than 1, and let a be a real number. • If n is odd, then a has one real nth root: $\sqrt[n]{a} = a^{1/n}$ • If n is even and $a > 0$, then a has two real nth roots: $\pm\sqrt[n]{a} = \pm a^{1/n}$ • If n is even and $a = 0$, then a has one nth root: $\sqrt[n]{0} = 0^{1/n} = 0$ • If n is even and $a < 0$, then a has no real nth roots.
Radicals and Rational Exponents (p. 415)	Let $a^{1/n}$ be an nth root of a, and let m be a positive integer. • $a^{m/n} = (a^{1/n})^m = (\sqrt[n]{a})^m$ • $a^{-m/n} = \frac{1}{a^{m/n}} = \frac{1}{(a^{1/n})^m} = \frac{1}{(\sqrt[n]{a})^m}, a \neq 0$
Properties of Rational Exponents (p. 420)	All of the properties of exponents listed on the previous page apply to rational exponents as well as integer exponents.
Product and Quotient Properties of Radicals (p. 421)	Let n be an integer greater than 1, and let a and b be positive real numbers. Then $\sqrt[n]{a \cdot b} = \sqrt[n]{a} \cdot \sqrt[n]{b}$ and $\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}$.

Properties of Logarithms

	Let a, b, c, m, n, x, and y be positive real numbers such that $b \neq 1$ and $c \neq 1$.
Logarithms and Exponents (p. 499)	$\log_b y = x$ if and only if $b^x = y$
Special Logarithm Values (p. 499)	$\log_b 1 = 0$ because $b^0 = 1$ and $\log_b b = 1$ because $b^1 = b$
Common and Natural Logarithms (p. 500)	$\log_{10} x = \log x$ and $\log_e x = \ln x$
Product Property of Logarithms (p. 507)	$\log_b mn = \log_b m + \log_b n$
Quotient Property of Logarithms (p. 507)	$\log_b \frac{m}{n} = \log_b m - \log_b n$
Power Property of Logarithms (p. 507)	$\log_b m^n = n \log_b m$
Change of Base (p. 508)	$\log_c a = \frac{\log_b a}{\log_b c}$

Properties of Functions

Operations on Functions (pp. 428, 430)	Let f and g be any two functions. A new function h can be defined using any of the following operations. **Addition:** $h(x) = f(x) + g(x)$ **Subtraction:** $h(x) = f(x) - g(x)$ **Multiplication:** $h(x) = f(x) \cdot g(x)$ **Division:** $h(x) = \frac{f(x)}{g(x)}$ **Composition:** $h(x) = g(f(x))$ For addition, subtraction, multiplication, and division, the domain of h consists of the x-values that are in the domains of both f and g. Additionally, the domain of the quotient does not include x-values for which $g(x) = 0$. For composition, the domain of h is the set of all x-values such that x is in the domain of f and $f(x)$ is in the domain of g.
Inverse Functions (p. 438)	Functions f and g are inverses of each other provided: $f(g(x)) = x$ and $g(f(x)) = x$

TABLES