Exponents and Logarithms

Fall 2011

Exponents

Key Facts of Exponents

(1) $x^0 = 1$, $x \neq 0$

(2) 0^0 is undefined.

Properties of Exponents

(1) $x^{a+b} = x^a x^b$

(2) $x^{a-b} = x^a x^{-b}$

(3) $x^{-a} = \dfrac{1}{x^a}$

(4) $(xy)^a = x^a y^a$

(5) $x^{ab} = (x^a)^b$

(6) $x^{\frac{a}{b}} = (x^{\frac{1}{b}})^a$

Logarithms

Key Facts of Logarithms

(1) $\log_b 1 = 0$

(2) $\log_b b = 1$

(3) $\log_b(b^x) = x$

(4) $b^{\log_b x} = x$

Properties of Logarithms

(1) $\log_b(xy) = \log_b x + \log_b y$

(2) $\log_b\left(\dfrac{x}{y}\right) = \log_b x - \log_b y$

(3) $\log_b x^a = a \log_b x$

(4) $\log_b x = \dfrac{\log_a x}{\log_a b}$ where $a > 0$, $a \neq 1$