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Exponential and logarithmic

Using our understanding of exponential features, we can discuss their opponents, which are the logarithmic functions. These are at hand when we need to consider any phenomenon that varies on a wide range of values, such as pH in chemistry or decibel in sound levels. The exponential function (f (x) = b ^ x) is one by one, with domain (Ã ¢ Ã ¢ Å¾, Ã ¢ Å¾) and interval (0, Ã ¢.). Therefore, it has a reverse function, called logarithmic function with base (B). For any (b> 0, b â € ° 1), the logarithmic function with base b, denoted (log_b), has a domain (((0, Ã ¢.)) And interval ((Ã ¢ 'Ã ¢ å½, Ã ¢ å¾) and satisfies (log_b (x) = y) if and only if (b ^ y = x). For example, (log_2 (8) = 3) Because (2 ^ 3 = 8), (Log_ {10} (DFrac {1} {100}) = Ã,2) Since (10 ^ {Ã,2 } = dPrac {1} {10 ^ 2} = dPrac {1} {100}), (b (1) = 0) Since the moment (b ^ 0 = 1) for any base (B> 0). Furthermore, since (y = log_ (x)) and (y = b ^ x) are inverse functions, [log_ (b ^ x) = x] [b ^ {log_b (x)} = x. The most commonly used logarithmic function is the function (log_e). Because this function uses natural and as a base, it is called the natural logarithm. Here We use the notation (LN (X) or (LN X) to mean (log_e (x)). For example, [LN (e) = log_e (e) = 1, LN (E ^ 3) = log_e (E ^ 3) = 3, LN (1) = log_e (1) = 0.] from the moment or that the functions (f (f (f (x) = and ^ x x) and (g (x) = ln (x) are inverses one another, (ln (e ^ x) = x) and (e ^ {ln x} = x), and their graphics are symmetrical on the line (y = x) (figure). Figure (PAGENDEX {4}): The functions (Y = E ^ X) and (Y = LN (X) are turned over another, so their graphics are symmetrical on the line (Y = X). In general, for any base (b> 0), (b â € 1), the function (x) = log_b (x) is symmetrical on the line (y = x) With the function (f (x) = b ^ x). Using this fact and the graphs of the exponential functions, graphic functions (log_b) for different values of b> 1 â € 0, b> 0), and (a â € 1, b â € 1). 1. (A ^ x = b ^ {xlog_ba}) For any real number (x). If (b = and), this equation reduces A (A ^ X = E ^ {XLog_a} = E ^ {X LN A}). 2. (Log_AX = DFRAC {Log_BX} {Log_BA} for any real number (X> 0). If (b = and), this equation reduces A (LOG_AX = DFRAC {LN X} {LN A}). Test for the first basic change formula, let's start using the power supply property of the logarithmic functions. We know it for any base (b> 0, b â € 1), (Log_B (A ^ X) = XLog_BA). Therefore, (b ^ {log_b (a ^ x)}) = (b ^ {xlog_ba}). Furthermore, we know that (b ^ x) and (log_) are inverse functions. Therefore, (b ^ {log_b (a ^ x)} = a ^ x). By combining these last two equality, we conclude that (a ^ x = b ^ {xlog_ba}). To demonstrate the second property, we show that ((log_ba) Ã ¢