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Logarithms Formulae

Sahi Prep Hai Toh Life Set Hai

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Logarithm:

Logarithm**,** the exponent or power to which a base must be raised to yield a given number. Expressed mathematically, x is the logarithm of n to the base a if $a^x = n$, in which case one writes $x = \log_a n$

For example, $2^3 = 8$; therefore, 3 is the logarithm of 8 to base 2, or $3 = \log_2 8$. In the same fashion, since $10^2 = 100$, then $2 = \log_{10} 100$.

Another way to understand this would be:

If $a^x = N$, then $x = \log_a N$

Logarithm of a negative number or zero is not defined.

Natural logarithm: base of the number is "e"

Common logarithm: Base of the number is 10. When the base is not mentioned, it can be taken as 10.

Properties of logarithm:

- $\log_a 1 = 0$
- $\log_a a = 1$
- $\log_a xy = \log_a x + \log_a y$
- $\log_a (X/Y) = \log_a X - \log_a Y$
- $\log_a b * \log_b a = 1$
- $b^{\log_b x} = x$
- $\log_a x = 1/ \log_x a$
- $\log_a b = \log_c b * \log_a c$
- $\log_a b^c = c * \log_a b$

- $x^{\log_b y} = y^{\log_b x}$
- $\log_a \sqrt[n]{b} = (\log_a b)/n$
- If $0 < a < 1$, then $\log_a x < \log_a y$ (if $x>y$)
- If $a > 1$ then $\log_a x > \log_a y$ (if $x>y$)

SOME POINTS TO REMEMBER:

- $\log(x - y) \neq \log x - \log y$
- $\log(x + y) \neq \log x + \log y$

log values of some numbers (base 10):

Number	Value
1	0
2	0.301
3	0.4771
4	0.602
5	0.698
6	0.778
7	0.845
8	0.903
9	0.954

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