LOGARITHMS

A **logarithm** (or **log**, for short) is a number that represents a power or exponent.

COMMON LOGS

In this course, we will focus only on base 10 logs, also called **common logs**, which are defined as follows:

$\log_{10} x$ is the power to which 10 must be raised to obtain x.

OR

$\log_{10} x$ means "10 to what power equals x?"

PROPERTIES OF LOGS

1. $\log_{10} 10^x = x$
2. $10^{\log_{10} x} = x$
3. $\log_{10}(x \cdot y) = \log_{10} x + \log_{10} y$
4. $\log_{10}(a^x) = x \cdot \log_{10} a$

Examples

Ex 11 Given that $\log_{10} 2 \approx 0.3$, calculate

a) $\log_{10} 8$

b) $10^{\log_{10} 2}$

c) $\log_{10} 200$

Ex 12 Can $10^{3.334}$ be between 500 and 1,000?

Ex 13 Is $log_{10}(8 \times 10^9)$ between 9 and 10?

Ex 14 If $log_{10}5 = 0.7$, what is $log_{10}0.05$?

Ex 15 Can $log_{10}1{,}000{,}000$ be between 16 and 17?

Ex 16 $log_{10}\pi$ is between 3 and 4. (True or False?)