# EXPONENTS AND LOGARITHMS

For $a > 0$, $b > 0$, $u$, $v$, and $n \in \Re$; let $M = a^u$ and $N = a^v$
then $u = \log_a M$ and $v = \log_a N$

| | | |
|---|---|---|
| **1.** | $a^u > 0$, $a^v > 0$ and $a \neq 1$ | $M > 0$ and $N > 0$ |
| **2.** | $a^u = a^v \Leftrightarrow u = v$ | $\log_a M = \log_a N \Leftrightarrow M = N$ |
| **3.** | $a^u a^v = a^{u+v}$ | $\log_a MN = \log_a M + \log_a N$ |
| **13.** | $a^{u-v} = \frac{a^u}{a^v}$ | |

$\log_e 10 = \ln 10 \doteq \log_{2.7182818284590452\overline{35}} 10 \doteq 2.3025850929405684$