4.1: Exponential & logarithmic form

- exponential form: $3^{2} = 9$ (2 ← exponent; 3 ↑ base)
- logarithmic form: $\log_3 9 = 2$ (2 ← exponent; 3 ↑ base)

°Ex 1) Rewrite in exponential form:

$\log_5 125 = 3$ → $5^3 = 125$

$\log_9 6561 = 4$ → $9^4 = 6561$

$5 = \log_2 32$ → $2^5 = 32$

$\log_{10} 100 = 2$ → $10^2 = 100$

* If your log has no written base, it is an understood base of 10

• Ex 2) Rewrite in logarithmic form:

$6^3 = 216$ → $\log_6 216 = 3$

$4^{-1} = \frac{1}{4}$ → $\log_4 \frac{1}{4} = -1$

$1000 = 10^3$ → $\log_{10} 1000 = 3$ → $\log 1000 = 3$

$4^2 = 16$ → $\log_4 16 = 2$

Calc:
math
Alpha
math

Solve logarithmic equations

• Ex 3) Solve $\log_7 x = 4$

$7^4 = x$

$x = 2401$

• Ex 4) Solve $\log_5 (3x+1) = 2$

$5^2 = 3x + 1$

$25 = 3x + 1$
$-1 \quad\quad -1$

$\frac{24}{3} = \frac{3x}{3}$

$x = 8$

• Ex 5) Solve $4 = \log_{10}(6x-3)$

$10^4 = 6x-3$

$10{,}000 = 6x-3$

$+3 \quad +3$

$\frac{10{,}003}{6} = \frac{6x}{6}$

$x = 1667.17$

• Ex 6) $\log_8(3x-1) = \log_8(2x+4)$

Property: If $\log_b m = \log_b N$, then $m=N$

Translation: If two logs have the same base & are equal, then whats inside your log is equal.

$3x-1 = 2x+4$

$+1 \quad +1$

$3x = 2x+5$

$-2x \quad -2x$

$x = 5$