

Evaluating Logs with the Calculator

$$\log_{\text{10}} 5 = 0.69$$

No # means its a base of 10

$$\log_3 16 = 4$$

$$\log_4 8 = 1.5$$

alpha
window
#5

Logarithmic Form: $\log_b a = x$

evaluating (pointing to a)
exponent (pointing to x)
base (pointing to b)

$$\log_3 9 = 2$$

Exponential Form: $b^x = a$

exponent (pointing to x)
evaluating (pointing to a)
base (pointing to b)

$$3^2 = 9$$

Rewrite in Exponential Form:

Example 1: $\log_5 125 = 3$

$$5^3 = 125$$

- ① base of exponent
= base of log
- ② log = exponent

Example 2: $\log_{10} 100 = 2$

$$10^2 = 100$$

Rewrite in Logarithmic Form:

Example 3: $2^4 = 16$

$$\log_2 16 = 4$$

Example 4: $10^3 = 1000$

$$\log_{10} 1000 = 3$$

$$\log 1000 = 3$$

Solving Logarithmic Equations

Example 1: Solve $\log_7 x = 4$

$$7^4 = x$$

$$x = 2401$$

Example 2: Solve $\log_5(3x + 1) = 2$

$$5^2 = 3x + 1$$

$$\begin{array}{r} 25 = 3x + 1 \\ -1 \qquad -1 \end{array}$$

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

$$x = 8$$

Example 3: Solve $\log_{10}(6x - 3) = 4$

$$10^4 = 6x - 3$$

$$\begin{array}{r} 10000 = 6x - 3 \\ +3 \qquad +3 \\ \hline \end{array}$$

$$\begin{array}{r} 10003 = 6x \\ \underline{\quad} \quad \underline{\quad} \\ \quad b \quad \quad b \end{array}$$

$$x = 1667.16$$

Example 4: Solve $\log_8(3x - 1) = \log_8(2x + 4)$

Property: If _____ = _____, then $M = N$

$$\cancel{\log_8(3x-1)} = \cancel{\log_8(2x+4)}$$

★ Because the bases match
I drop the log

$$\begin{array}{r} 3x-1 = 2x+4 \\ -2x \quad -2x \\ \hline \end{array}$$

$$\begin{array}{r} x-1 = 4 \\ +1 \quad +1 \\ \hline \end{array}$$

$$\boxed{x=5}$$

Homework is Page 2.1 in Packet