

Logarithms:

H_2O

$$y = \log_3 9$$

"Y" equals log base 3 of 9"

"What is the exponent Y if 3 is the base and 9 is the value?"

Logarithm

Exponential

$$2 = \log_{10} 100 \iff 100 = 10^2$$

↑ Exponent

Base

$$4 = \log_3 81 \iff 81 = 3^4$$

$$1) 32 = 2^5 \Rightarrow 5 = \log_2 32$$

$$2) \quad \quad \quad 5 = \log_3 243$$

$$3) 625 = 5^4 \Rightarrow 4 = \log_5 625$$

$$4) \log_3 9 = 2 \Rightarrow 3^2 = 9$$

$$5) \log_5 125 = 3 \Rightarrow 5^3 = 125$$

$$6) \log_8 512 = 3 \Rightarrow 512 = 8^3$$

Evaluating a Log Steps:

$$1) \log_8 32 = x$$

$$8^x = 32$$

$$(2^3)^x = 2^5$$

$$2^{3x} = 2^5$$



1) Write as a log function

2) Rewrite as an exponential function.

3) Write each side using a common base

4) Drop the bases and set the exponents equal to each other.

$$\begin{array}{r} \cancel{3}x = 5 \\ \hline \cancel{3} \quad \cancel{3} \\ \hline x = \frac{5}{\cancel{3}} \end{array}$$

$$\text{Log}_4 32 = X$$

$$4^X = 32$$

$$(2^2)^X = 2^5$$

$$2^{2X} = 2^5$$

$$\frac{2X}{2} = \frac{5}{2}$$

$$X = 2\frac{1}{2} = \frac{5}{2}$$

$$\log_4 64 = x$$
$$4^x = 64$$
