

Logarithms       $2^x = 4$   
Inverses               $x = 2$

Multiplication  $\longleftrightarrow$  Division

Addition  $\longleftrightarrow$  Subtraction

$$\begin{array}{r} x + 3 = 7 \\ -3 = -3 \\ \hline x = 4 \end{array}$$

Exponential Functions  $\longleftrightarrow$  Logarithmic Function  
 Inverse

$$2^x = 2^2$$

$$2^x = 8^3$$

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

$$2^x = 2^9$$

$$3^x = 8^3$$

$$y = b^x$$

$\swarrow$  base       $\nwarrow$  exponent

$$y = \log_b x$$

$\swarrow$  exponent       $\nwarrow$  base       $\nearrow$  value

$$y = \log_3 9$$

"y" equals log base "b" of "x".

"What is the exponent 'y' if 3 is the base and 9 is the answer?"

$$3^y = 9$$

$$3^2 = 9$$

Convert to log

$$125 = 5^3$$

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

$\swarrow$  base

$$10^2 = 100$$

$$3 = \log_5 125 \quad \text{Exp} = \log_{\text{base}} \text{Value}$$