

# Logs (converting, COB, Evaluate)

UNIT 8 LESSON \_\_\_\_\_ INVESTIGATION \_\_\_\_\_ NOTES

## Lesson Vocabulary

Logarithm (log) - The inverse of an exponential.

if  $y = b^x$ , then  $\log_b y = x$   
↑  
exponential reads "log base b of y"

Common log - A logarithm of base 10

\* if no subscript is written, then the base is 10.

\* Calculator key is in base 10.

$\log 5$  - has base 10 (10 raised to what power is 5)

$\log_3 9$  - has base 3 (3 raised to what power is 9)

Change of Base (COB) - Used to evaluate a log with any base.

$$\log_b y = \frac{\log y}{\log b} \quad (\text{use calc})$$

Example Problem(s)

ex.) Write in logarithmic form.

$$a) 25 = 5^2$$

y      b

$$\log_5 25 = 2$$

$$b) 3^6 = 729$$

b      y

$$\log_3 729 = 6$$

$$c) 1 = 10^0$$

y      b

$$\log 1 = 0$$

ex.) Write in exponential form.

$$a) \log_b b = x$$

$$b = b^1$$

$$b) 4 = \log_2 16$$

x      b      y

$$16 = 2^4$$

$$c) \log_9 27 = \frac{3}{2}$$

b      y      x

$$27 = 9^{\frac{3}{2}}$$

ex.) Evaluate each log.

$$a) \log_2 8$$

$$\frac{\log 8}{\log 2} = 3$$

$$b) \log 1$$

$$\frac{\log 1}{\log 10} = 0$$

$$c) \log_7 \frac{1}{49}$$

$$\frac{\log \frac{1}{49}}{\log 7} = -2$$