

Objective: To evaluate and rewrite exponential and logarithmic functions.

Warm Up:

Solve for x .

A.) $64^{x+3} = 2^{4x+6}$

$$(2^6)^{x+3} = 2^{4x+6}$$

$$2^{6x+18} = 2^{4x+6}$$

$$6x+18 = 4x+6$$

$$2x = -12$$

$$x = -6$$

B.) $36^{x+4} = 216^{3x+1}$

$$(6^2)^{x+4} = (6^3)^{3x+1}$$

$$6^{2x+8} = 6^{9x+3}$$

$$2x+8 = 9x+3$$

$$5 = 7x$$

$$x = \frac{5}{7}$$

C.) $3^x = 4$

$$\log_3 4 = x$$

$$x = \frac{\log 4}{\log 3}$$

$$x \approx 1.26$$

Example 1: Convert the following forms from either exponential to logarithmic or logarithmic to exponential.

A.) $\log_3 243 = 5$

$$3^5 = 243$$

B.) $5^4 = 625$

$$\log_5 625 = 4$$

C.) $\log_6 1 = 0$

$$6^0 = 1$$

D.) $4^3 = 64$

$$\log_4 64 = 3$$

E.) $\log_2 2 = 1$

$$2^1 = 2$$

F.) $7^0 = 1$

$$\log_7 1 = 0$$

G.) $\log_5 25 = 2$

$$5^2 = 25$$

H.) $1^8 = 1$

$$\log_1 1 = 8$$

Example 2:

Rewrite the logarithmic form to exponential form & then evaluate/solve each one. Remember, when you do not see an equal sign, but the question tells you to evaluate, pretend the logarithm equals x .

A.) $\log_4 16 = x$

$$4^x = 16$$

$$x = 2$$

B.) $\log_2 \frac{1}{64} = x$

$$2^x = \frac{1}{64}$$

$$x = -6$$

C.) $\log_5 1 = x$

$$5^x = 1$$

$$x = 0$$

D.) $\log_2 x = -4$

$$2^{-4} = x$$

$$x = \frac{1}{16}$$

E.) $\log_x 25 = 2$

$$x^2 = 25$$

$$x = 5$$

F.) $\log_x \frac{1}{81} = -2$

$$x^{-2} = \frac{1}{81}$$

$$x = 9$$

G.) $\log_x 32 = 5$

$$x^5 = 32$$

$$x = 2$$

H.) $\log_6 216 = x$

$$6^x = 216$$

$$x = 3$$

I.) $\log_3 x = -3$

$$3^{-3} = x$$

$$x = \frac{1}{27}$$

J.) $\log_7 1 = x$

$$7^x = 1$$

$$x = 0$$

K.) $\log_{10} 100 = x$

$$10^x = 100$$

$$x = 2$$

L.) $\log_4 x = 2$

$$4^2 = x$$

$$x = 16$$