

Logarithmic Functions

Hw #
Omega 4A

Write each equation in logarithmic form.

#1) $2^4 = 16$	#2) $3^{-3} = \frac{1}{27}$	#3) $8^{\frac{-2}{3}} = \frac{1}{4}$
----------------	-----------------------------	--------------------------------------

Write each equation in exponential form.

#4) $\log_2 8 = 3$	#5) $\log_{10} 10,000 = 4$	#6) $\log_8 2 = \frac{1}{3}$
--------------------	----------------------------	------------------------------

Evaluate each expression.

#7) $\log_9 9^6$	#8) $12^{\log_{12} 5}$
#1	#2
#9) $\log_6 6^5$	#10) $\log_a a^{10}$
#3	#4
#11) $\log_8 8$	#12) $10^{4\log_{10} 2}$
#5	#6

Logarithmic Functions

Solve each equation.

<p>#13) $\log_5 0.04 = x$</p>	<p>#14) $\log_3 (3x) = \log_3 36$</p>
<p>#13</p>	<p>#14</p>
<p>#15) $\log_6 216 = x$</p>	<p>#16) $\log_2 4 + \log_2 6 = \log_2 x$</p>
<p>#15</p>	<p>#16</p>
<p>#17) $\log_3 12 - \log_3 x = \log_3 3$</p>	<p>#18) $\log_4 (x - 3) + \log_4 (x + 3) = 2$</p>
<p>#17</p>	<p>#18</p>

Logarithmic Functions

Hw #
Omega 4A

#19) $\log_9(5x) = \log_9 6 + \log_9(x - 2)$

Graph each equation or inequality.

#20) $y = \log_4 x$

#21) $y = \log_{\frac{1}{2}} x$

Logarithmic Functions

#22) $y \leq \log_6 x$

#23) The generation time for bacteria is the time that it takes for the population to double. The generation time, G , can be found using experimental data and the formula $G = \frac{t}{3.3 \log_b f}$, where t is the time period, b is the number of bacteria at the beginning of the experiment, and f is the number of bacteria at the end of the experiment. The generation time for mycobacterium tuberculosis is 16 hours. How long will it take for two of these bacteria to multiply into 256 bacteria?

Logarithmic Functions

Hw #
Omega 4A

#24) Atlantic salmon swim up to 2000 miles upstream to spawn each year. Scientists who study salmon have found that the oxygen consumption of a yearling salmon, O , is given by the function

$$O = 100\left(3^{3v/5}\right), \text{ where } v \text{ is the velocity of the fish traveling in feet per second.}$$

a. Find the oxygen consumption of a fish not moving

b. How fast is a fish swimming when its oxygen consumption is 2700 units?

Logarithmic Functions

- | | | | |
|------|--|------|-----------------------------|
| #1) | $\log_2 16 = 4$ | #13) | -2 |
| #2) | $\log_3 \left(\sqrt[3]{\frac{1}{27}}\right) = -3$ | #14) | 12 |
| #3) | $\log_8 \left(\sqrt[3]{\frac{1}{4}}\right) = -\frac{2}{3}$ | #15) | 3 |
| #4) | $2^3 = 8$ | #16) | 24 |
| #5) | $10^4 = 10,000$ | #17) | 4 |
| #6) | $8^{\frac{1}{3}} = 2$ | #18) | 5 |
| #7) | 6 | #19) | 12 |
| #8) | 5 | #20) | See Calculator |
| #9) | 5 | #21) | See Calculator |
| #10) | 10 | #22) | See Calculator |
| #11) | 1 | #23) | 17 days 14 hours 24 minutes |
| #12) | 16 | #24) | a. 100 units
b. 5ft/sec |