

## Precalculus - Section 3.4- Properties of Logarithms



Use  $\log 2 \approx 0.30$ ,  $\log 3 \approx 0.48$ ,  $\log 7 \approx 0.85$  together with your knowledge of logarithms and their properties complete the following table without using the *log* key on your calculator.

log 1	log 2	log 3	log 4	log 5	log 6	log 7	log 8	log 9	log 10
0	0.30	0.48	.6	.7	.78	0.85	.9	.96	1

### Re-Expressions:

$$\log 1 = 0$$

$$\log 4 = \log 2^2 = 2 \log 2 = 2(.3) = .6$$

$$\log 5 = \log \frac{10}{2} = \log 10 - \log 2 = 1 - .3 = .7$$

$$\log 6 = \log 3 \cdot 2 = \log 3 + \log 2 = .48 + .30 = .78$$

$$\log 8 = \log 2^3 = 3 \log 2 = 3(.3) = .9$$

$$\log 9 = \log 3^2 = 2 \log 3 = 2(.48) = .96$$

↙ can only multiply/divide  
OR raise to a power to  
get result



## NOW YOU TRY!

Use  $\log_2 3 \approx 1.58$ ,  $\log_2 7 \approx 2.81$ , and  $\log_2 10 \approx 3.32$  together with your knowledge of logarithms and their properties, complete the following table without using the *log* key on your calculator.

**HINT: There are FOUR of these that you can just EVALUATE without using ANY properties!!!!**

$\log_2 \left(\frac{1}{2}\right)$	$\log_2 2$	$\log_2 3$	$\log_2 4$	$\log_2 5$	$\log_2 6$	$\log_2 7$	$\log_2 8$	$\log_2 9$	$\log_2 10$	$\log_2 14$
-1	1	1.58	2	2.32	2.58	2.81	3	3.16	3.32	3.81

Re-Expressions:

$$\log_2 5 = \log_2 \frac{10}{2} = \log_2 10 - \log_2 2 = 3.32 - 1$$

$$\log_2 6 = \log_2 (2 \cdot 3) = \log_2 2 + \log_2 3 = 1 + 1.58$$

$$\log_2 9 = \log_2 (3 \cdot 3) = \log_2 3 + \log_2 3 = 1.58 + 1.58 = 3.16$$

$$\log_2 14 = \log_2 (7 \cdot 2) = \log_2 7 + \log_2 2 = 2.81 + 1$$

Using the fact that  $\ln 3 \approx 1.10$ ,  $\ln 4 \approx 1.39$ , and  $\ln 15 \approx 2.71$  together with your knowledge of logarithms and their properties, complete the following table without using the *log* key on your calculator.

**HINT: You may want to find  $\ln 2$  FIRST using one of the known values in the chart!!!!**

$\ln 1$	$\ln 2$	$\ln 3$	$\ln 4$	$\ln 5$	$\ln 6$	$\ln 7.5$	$\ln 12$	$\ln 15$	$\ln 16$	$\ln 20$	$\ln 25$	$\ln 30$	$\ln 60$
0	0.70	1.10	1.39	1.6	1.8	2.0	2.5	2.71	2.78	2.99	3.2	3.41	4.1

Re-Expressions:

$$\ln 4 = 1.39$$

$$\ln 2^2 = 1.39$$

$$2 \ln 2 = 1.39$$

$$\ln 2 = 0.70$$

$$\ln 30 = \ln(15 \cdot 2) = \ln 15 + \ln 2$$