Name: _____ Date: _____

Learning Goal 8.1	Solving exponential and logarithmic equations with same base and with different bases, including base e.

Power Law	**Product Law**	**Quotient Law**

Example Evaluate.

a. $\log_5 75 - \log_5 3$

b. $\log_2 8$

Example Simplify.

a. $5^{\log_5(a+b)}$

b. $8^{2\log_2 m - {}^1/_2 \log_2 n^6}$

Example Change of Base

$$\log_b x = \frac{\log_a x}{\log_a b}$$

Assignment p. 400 # 11 – 16, 18 – 20, C2 Quiz Next Day!

Example Write as a single logarithm.

a. $\dfrac{\log_{11} 10}{\log_{11} 5}$

b. $\dfrac{\log_3 7}{\log_3 4}$

Example Simplify by changing the base of the logarithm. Check using a calculator.

a. $\log_{27} 9$

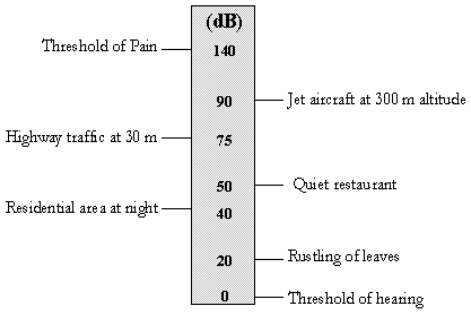
b. $\log_8 32 + \log_{16} 2$

Example Simplify. State any restrictions on the variable.

$$4\log_3 x - \frac{1}{2}(\log_3 x + 5\log_3 x)$$

Example The decibel scale measures the loudness of sound. Each 10 unit step on the scale represents a 10 fold increase in loudness. The intensity level, β is related to I, the intensity of the sound, in watts per square metre $\left(\mathrm{W}/\mathrm{m}^2\right)$ and $I_0 = 10^{-12}\ \mathrm{W}/\mathrm{m}^2$ (the faintest sound that can be heard by a person with normal hearing) by the following:

$$\beta = 10\log\left(\frac{\mathrm{I}}{\mathrm{I}_0}\right)$$



Sounds that are at most $100\ 000$ times as intense as a whisper are considered to be safe, no matter how long or how often you hear them. The sound level of a whisper is 20 dB. What sound level can be considered safe, no matter how long it lasts?