Pg. 239 3.3 – Properties of Logarithms

Change of Base Formula: $\log_a x = \frac{\log x}{\log a}$ or $\log_a x = \frac{\ln x}{\ln a}$

Ex 1:

Rewrite the logarithm as a ratio of
common logarithms and natural logarithms.Evaluate using the change-of-base
formula. $a) \log_3 x$ $b) \log_7 4$

Properties of Logarithms

Product Property $\log_a xy = \log_a x + \log_a y$

Quotient Property $\log_a \frac{x}{y} = \log_a x - \log_a y$

 $Power \ Property \qquad \log_a x^y = y \log_a x$

Ex 2:

Expand the given expression. Tip: Only expand logs of numbers that can be simplifed.

a) $\log_3 10x$ **b**) $\log_6 \frac{1}{x^3}$

Ex 3:

Use the properties of logarithms to rewrite and simplify the logarithmic expression.

Find the exact value of the logarithmic expression without using a calculator.

a) $\log \frac{9}{300}$

b)
$$\log_3 81^{-0.2}$$

Ex 4: Expand.

a) $\log 4x^2y$

b)
$$\ln\left(\frac{x^2-1}{x^3}\right), x > 1$$

Ex 5: Condense the expression. Tip: Apply properties from left to right when condensing. a) $2\ln 8+5\ln(x-4)$ b) $2[3\ln x - \ln(x+1) - \ln(x-1)]$

Assignment 3.3

Pg. 243 Vocab #'s 1-5 Problem Set #'s 1-77 ODD <u>REQUIRED</u>: Vocab, 3, 11, 19, 21, 27, 29, 33, 37