MATH 1010 ~ Intermediate Algebra

Chapter 9: EXPONENTIAL AND LOGARITHMIC FUNCTIONS

Section 9.4: Properties of Logarithms

Objectives:

- Use the properties of logarithms to evaluate logarithms.
- Use the properties of logarithms to rewrite, expand and condense logarithmic expressions.

$\log_2(xy)=\log_2 x+\log_2 y$

$\ln(x^2)=2*\ln x$

Properties of Logarithms

$$\log_a(uv) = \log_a u + \log_a v$$

$$\log_a\left(\frac{u}{v}\right) = \log_a u - \log_a v$$

$$\log_a u^n = n\log_a u$$

① EXAMPLE

Evaluate or simplify these expressions.

$a)\quad \ln(e^2 \cdot e^4)$

$b)\quad \log_6 2 + \log_6 3$

$c)\quad \log_2 5 - \log_2 40$

$d)\quad \ln\left(\frac{6}{e^5}\right)$

② EXAMPLE

Expand these expressions using the properties of logarithms.

$a)\quad \ln(5x)$

$b)\quad \log_5 \sqrt{xy}$

$c)\quad \log\sqrt{\frac{3x}{x-5}}$

$d)\quad \ln(y(y-1)^2)$

③ EXAMPLE

Condense these expressions using properties of logarithms.

a) $\log_5(2x) + \log_5(3y)$

b) $5[\ln x - \frac{1}{2}\ln(x+4)]$

c) $3[\frac{1}{2}\log(x+6) - 2\log(x-1)]$