# Math-3
# Lesson 5-5

Properties of Logarithmic Functions
(Product of Logs
Log of a Power)

$$f(x) = 5^{2x+4} \quad \text{Find} \quad f^{-1}(x)$$

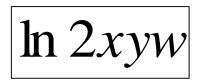Expand the Logarithm: use properties of logs to rewrite a single log as an expression of separate logs.

$$\log_3 xy$$

$$\log_3 45$$

$$\log(3xy^2)$$

Expand the Logarithm: use properties of logs to rewrite a single log as an expression of separate logs.

$$\log_4 6$$

$$\ln 2xyw$$

Condense the Logarithm: apply properties of logarithms to rewrite the log expression as a single log.

$$\log_2 7 + \log_2 5$$

$$\log 5 + \log x$$

$$\log_7 5 + \log_5 7$$

$$\log x^3$$

$$\ln 8$$

$$\log \sqrt{x}$$

$$\log_3 x^2 y^3 \sqrt[4]{z}$$

# More Practice

1. Convert to a logarithm: $7 = 2(3)^x$

2. Convert to an exponential; $3\log_5(x-6) = 6$

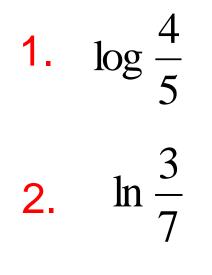3. What is the Domain and range? $f(x) = 3\log(x+2) - 5$

# More Practice

4.  Simplify:  $(3)^{\log_3 x}$

5a.  What is the logarand?  $f(x) = 2\log(2x - 4) - 6$

5b.  What is the vertical asymptote?

## Expand the Quotient

1. $\log \dfrac{4}{5}$

2. $\ln \dfrac{3}{7}$

## Condense the quotient

3. $\log_4 5 - \log_4 2$

4. $\log_5 8 - \log_5 16$

# Expand the quotient

$$\log_4 \frac{2\sqrt{x}}{4yz}$$