Name:_____ Hour: _____ Date: _____

NOTES: Section 7.5 – Apply Properties of Logarithms

Goals: #1 - I can use properties of a logarithm to evaluate logarithms.

#2 - I can use properties of a logarithm to expand and condense logarithms.

#3 - I can use the change of base formula to evaluate logarithms.

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Homework: Lesson 7.5 Worksheet

Warm Up:

1. Rewrite the equation in its alternate form.
   a. $\log 10{,}000 = 4$
   b. $e^7 = x - 3$

2. Evaluate the logarithm without a calculator.
   a. $\log_6 216$
   b. $\log_{16} \frac{1}{4}$
   c. $\log_{1/4} 16$

3. Find the inverse of the function.
   a. $y = \log(x - 2)$
   b. $y = (0.4)^x$

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Exploration #1: Work with a partner and answer the following questions.

1. Let $x = \log_b m$ and $y = \log_b n$

    a. Rewrite these logarithmic equations in exponential form:

        $x = \log_b m \rightarrow$ $y = \log_b n \rightarrow$

    b. Now multiply mn:

        $mn =$

    c. Rewrite this exponential equation in logarithmic form:

        $mn = b^{x+y} \rightarrow$

2. Let $x = \log_b m$ and $y = \log_b n$

    a. Rewrite these logarithmic equations in exponential form:

        $x = \log_b m \rightarrow$ $y = \log_b n \rightarrow$

    b. Now divide $\frac{m}{n}$:

        $\dfrac{m}{n} =$

    c. Rewrite this exponential equation in logarithmic form:

        $\frac{m}{n} = b^{x-y} \rightarrow$

Notes:

_____:

Product Property	
Quotient Property	
Power Property	

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Example #1: Use $\log_4 3 \approx 0.792$ and $\log_4 7 \approx 1.404$ to evaluate the logarithm.

    1. $\log_4 \frac{3}{7}$
                         2. $\log_4 21$
                         3. $\log_4 49$

Example #2: Use the properties of logarithms to expand or condense the following expressions.

    1. Expand $\log_6 \frac{5x^3}{y}$

    2. Condense $\log 2 + 3 \log 3 - \log 9$

You practice: Use the properties of logarithms to expand or condense the following expressions.

    1. Expand $\log_3 \frac{7x^2}{y}$

    2. Condense $\ln 4 + 3 \ln 3 - \ln 12$

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Notes:

_____:

Since our calculators can only evaluate logarithms with base _____, we can use the
change-of-base formula to evaluate _____ logarithm using a calculator.

Example #3: Use the change-of-base formula to evaluate the logarithm.

    1. $\log_3 8$ 2. $\log_6 11$

Extra practice:

    1. Expand $\log_7 \dfrac{3x^2}{5y^3}$ 2. Condense $5\log_4 2 + 7\log_4 x - 4\log_4 y$