11.6

Date:

Objective:

Properties of exponents	Properties of logarithms
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.
6.	6.
7.	7.
8.	8.

Example:

Simplfiy. Do not use a calculator.

1. $\log_4 1$

2. $5^{\log_5 3}$

3. $\log_7 7^{-3}$

4. $\ln e^5$

5. $\log_2 64$

6. $\log_7 \frac{1}{49}$

7. $\log \sqrt{10}$

Example:

Condense to one logarithm or simplify.

1. $\ln 8 + \ln x$

2. $\text{Log}\, u - \log v$

3. $\frac{1}{4} \log_6 x$

4. $3 \log_7 x + \log_7 4$

5. $5 \log 2 - \log 5x$

6. $4 \ln(uv) - 3 \ln(vw)$

7. $\log(x-4) + \log(6x+5)$

Example:

Expand or write with more than one logarithm.

1. $\log 5x$
2. $\log \frac{5}{x}$
3. $\log_7 x^5$
4. $\ln(x^2 e^x)$
5. $\log_6 \frac{\sqrt[4]{y}}{\sqrt[4]{x}}$

Change of base formula:

$\log_b x =$ __________ =___________

Example:

Write each logarithm using change of base formula. Then evaluate the logarithm rounding to the nearest ten-thousandth. Use common logarithms.

1. $\log_6 9$
2. $\log_6 3.5$

Example:

Write each logarithm using change of base formula. Then evaluate the logarithm rounding to the nearest ten-thousandth. Use natural logarithms.

1. $\log_3 8$
2. $\log_2 4.12$

Sometimes, when we substitute the given information into the equation the variable is in the exponent. When this happens, you need to use logarithms to solve for the variable.

Example:

1. The population of a bacteria can be modeled by $P(t) = 350(1.25)^t$. According to this model, when will the population be 800? Round to the nearest tenth of a day.

2. The value of a cell phone that is t years old can be modeled by $v(t) = 1{,}399(0.18)^t$. According to the model, when will the phone be worth $300? Round to the nearest tenth of a year.