

Solutions

Math 71B Summer 2006

Name: _____

QUIZ #9 @ 20 points Sections 9.3, 9.4

Write neatly. Use a pencil. Show work in order to get credit. No proof, no credit given.

1. Write the equation in its equivalent logarithmic form.

$$7^x = 200 \quad \Leftrightarrow$$

$$\log_7 200 = x$$

2. Write the equation in its equivalent exponential form

$$\log_6 216 = y \quad \Leftrightarrow$$

$$6^y = 216$$

3. Evaluate each expression without using a calculator.

a) $\log_4 16 = 2$ because $4^2 = 16$

b) $\log_3 1 = 0$ because $3^0 = 1$

c) $\log 100 = 2$ because $10^2 = 100$

d) $\ln e = 1$ because $e^1 = e$

e) $\ln e^{9x} = 9x$

f) $\log_3(\log_7 7) = \log_3 1$
 $= 0$

4. Find the domain of the function $f(x) = \log_5(x-3)$.

Condition: $x-3 > 0$ Domain = $(3, \infty)$
 $x > 3$

5. Use properties of logarithms to expand each expression as much as possible.

a) $\log_4\left(\frac{64}{x}\right) = \log_4 64 - \log_4 x$
 $= 3 - \log_4 x$

b) $\log_6(xy^3) = \log_6 x + \log_6 y^3$
 $= \log_6 x + 3 \log_6 y$

6. Use properties of logarithms to condense each expression. Write each expression as a single logarithm. Where possible, evaluate the logarithm.

a) $\log_2 96 - \log_2 3 = \log_2 \frac{96}{3}$
 $= \log_2 32$
 $= 5$

b) $8 \ln(x+9) - 4 \ln x =$
 $= \ln (x+9)^8 - \ln x^4$
 $= \ln \frac{(x+9)^8}{x^4}$