

NAME: _____

QUIZ 5

Dawson College

Applied Math (201-943-DW S1)

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Instructor: E. Richer

Question 1. (6 marks)

Solve the following equations.

(a) $3 = 2^x$

$$\ln 3 = \ln 2^x$$

$$\ln 3 = x \ln 2$$

$$x = \frac{\ln 3}{\ln 2}$$

(b) $\ln(x^2 - 9) - \ln(x + 3) = \ln 2$

$$\ln\left(\frac{x^2 - 9}{x + 3}\right) = \ln 2$$

$$\frac{x^2 - 9}{x + 3} = 2$$

$$x^2 - 9 = 2x + 6$$

$$x^2 - 2x - 15 = 0 \Rightarrow (x - 5)(x + 3) = 0$$

$$x = 5, -3$$

ONLY $x = 5$ IS A SOLUTION

(c) $2^{x+1} = 3^{x-1}$

$$\ln 2^{x+1} = \ln 3^{x-1}$$

$$(x+1)\ln 2 = (x-1)\ln 3$$

$$x \ln 2 + \ln 2 = x \ln 3 - \ln 3$$

$$x \ln 2 - x \ln 3 = -\ln 3 - \ln 2$$

$$x(\ln 2 - \ln 3) = -\ln 3 - \ln 2$$

$$x = \frac{-\ln 3 - \ln 2}{\ln 2 - \ln 3}$$

Question 2. (4 marks)

Use properties of logarithms to express each of the following as a single logarithm.

(a) $\log_4 x - \log_4 y = \log_4 (x/y)$

(b) $\log_4 x + \log_4 y = \log_4 (xy)$

(c) $(\log_4 x)(\log_4 y) = \log_4 (y^{\log_4 x})$

(d) $\frac{\log_4 x}{\log_4 y} = \log_4 x^{\frac{1}{\log_4 y}}$