

Name:

Date:

MHF4U Test

Chapter 3c – Logarithms

Section 1: True or False [4K]

- | | | |
|--|---|---|
| 1) $\log(x + y) = \log x + \log y$ | T | F |
| 2) You can write $\log(20) - \log(5)$ as $\log(15)$ | T | F |
| 3) You can write $\frac{\log x}{\log y}$ as $\log\left(\frac{x}{y}\right)$ | T | F |
| 4) $4 \log(x) = \log(x^4)$ | T | F |

Section 2: Multiple Choice: Write the letter of the correct answer on the line [4K]

____ 5) Evaluate $\log(1)$

- a) 2
- b) 10
- c) 1
- d) 0

____ 6) Re-write $\log_4 52 = y$ in exponential form

- a) $4^y = 52$
- b) $y^4 = 52$
- c) $52^y = 4$
- d) $4^{52} = y$

____ 7) Evaluate $\log_5(\sqrt{25})$

- a) $\frac{1}{2}$
- b) 1
- c) 2
- d) $\frac{5}{2}$

____ 8) Evaluate $\log_3(-9)$

- a) -3
- b) 2
- c) -2
- d) Does not exist

Section 3: Simplifying Expressions and Solving Equations [38]

9) Write as a single logarithm and then evaluate. Round to 2 decimal places if necessary. [8K]

a) $\log_2(80) - \log_2(10)$

b) $\log_3(4) + 2 \log_3(4) - \log_3(8)$

c) $\frac{\log_9(20)}{\log_9(8)}$

d) $\log(x^2 - 4) - \log(x^2 - 6x + 8)$

10) Is it possible to write 20 as a base 3 power? If so, write it. If not, explain why not. [2T]

11) Solve each exponential equation. Use and show appropriate methods. Round to 3 decimal places where necessary. [12A]

a) $2^{x-1} = (8)^{2x+3}$

b) $21^{x+3} = 14$

c) $3^{x+5} = 5^{2x-1}$

d) $5^{2x} + 8(5^x) - 20 = 0$

12) Solve the following logarithmic equations. Use and show appropriate methods. Round to 3 decimal places where necessary. Make sure to check for extraneous roots where necessary. [18A]

a) $\log \sqrt{x^2 - 3x} = \frac{1}{2}$

b) $\log(x + 2) + \log(x - 1) = 1$

c) $4 = \log_2(2x - 10)$

d) $\log(x + 5) = 2 \log(x - 1)$

e) $12 = \log_2(8^x)$

f) $\log(2x^4) - 3\log(x) = \log(2)$

EXTRA FUN: Write $(\log_a b)(\log_b c)(\log_c d)$ as a single logarithm.