



# SEKOLAH BUKIT SION – HIGH SCHOOL

## CHAPTER 6 (A-MATH): LOGARITHMS

NAME: \_\_\_\_\_ CLASS: \_\_\_\_\_ DATE: \_\_\_\_\_

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### QUESTION 01

Given that  $x = \log_a y$  :

- (a) express  $y$  in terms of  $a$  and  $x$ , [1]  
(b) express  $a$  in terms of  $x$  and  $y$ , [1]  
(c) if  $x = 3$ , write down the numerical value of  
(i)  $\log_a y^2$  [1]  
(ii)  $\log_a (ay)^3$  [2]  
(iii)  $\log_a \left(\frac{y^3}{a^2}\right)$  [2]

### QUESTION 02

Find the value of  $x$  in the following equations, correct to 3 significant figures when necessary.

- (a)  $2\lg(\lg 5x) = 0.32$ , [3]  
(b)  $\log_2(x^2 + 32) + \log_2 \frac{1}{x} = 2 + \log_2 3$  [4]  
(c)  $\log_3 x + \log_9 x = 4\frac{1}{2}$  [3]  
(d)  $\ln(x + 1) - \ln(x - 2) = 1$  [3]

### QUESTION 03

With appropriate substitution, find the exact values of  $x$ .

- (a)  $e^{2x} = 3e^x + 4$  [4]  
(b)  $2(\log_5 x)^2 + 3 = 7 \log_5 x$  [5]

**QUESTION 04**

**EITHER**

(a) Solve for the values of  $y$  in  $y^2 - 5y - 1 = 0$ , expressing your answers in surd form. [3]

(b) Using your answers in **part (a)**, find the values of  $x$  in  $e^{4x+2} = 5e^{2x+2} + e^2$ , correct to 3 sf. [4]

**OR**

(a) Show that  $5^{x+2} - 3^{2x+1} = 2(5^{x+1})$  **simplifies to**  $5^{x+1} = 3^{2x}$ . [3]

(b) Solve  $5^{x+1} = 3^{2x}$ . Express your final answer correct to 3 sf. [4]

**QUESTION 05**

Solve the simultaneous equations:  $3^x - 4^y = 5$  and  $3^{x+1} + 4^y = 23$

Express  $x$  and  $y$  values in their exact form. [4]

**QUESTION 6.**

Given that

$$f(x) = e^x + 3$$

$$g(x) = 2 - 3e^{-x}$$

$$h(x) = \ln(x + 2)$$

(a) Find, in simplest forms,

(i)  $f^{-1}(x)$  [2]

(ii)  $fh(x)$  [3]

(b) Solve  $h^{-1}(x) = g(x)$ . [5]