Unit: Logarithmic Functions

Section A: Selected Response: Place the letter of your response in the space at the right. (15 marks)

1. What is the exact value of x: $3 = 2^{x+1}$

1.____

- A) $\log\left(\frac{3}{2}\right) 1$
- B) $\frac{\log 3}{\log 2} 1$
- C) $\log\left(\frac{3}{2}\right) + 1$
- D) $\frac{\log 3}{\log 2} + 1$
- 2. Solve for x: $\log_4(3x) + \log_4(x-2) = \log_4 24$

2.____

- A) x = -4
- B) x = 4
- C) x = -2
- D) x = 2
- 3. What is the domain of $y = -\log_5(6-x)$?

3.____

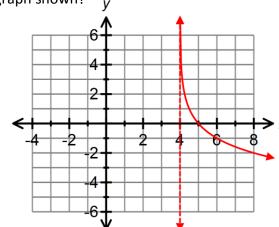
- A) x > -6
- B) x < -6
- C) x > 6
- D) x < 6
- 4. What is the equivalent logarithmic form of $3^y = x+1$?

4.___

- A) $y = \log_3(x-1)$ B) $y = \log(3x+1)$
- C) $y = \log_3(x+1)$
- D) $y = \log(3x 1)$
- 5. What is the equation of the graph shown?

5.____

- A) $y = \log_2(x 4)$
- B) $y = -\log_2(x-4)$
- C) $y = -\log_2(x+4)$
- D) $y = \log_2(x+4)$



6. Solve for x: $\log_2(\log_x 64) = 1$

6.____

- A) x = 8
- B) x = 4
- C) x = 16
- D) x = 32
- 7. Which expression is equivalent to $\log \frac{A^3}{\sqrt{B}C^4}$?

- A) $3\log A \frac{1}{2}\log B + 4\log C$
- B) $3\log A \frac{1}{2}\log B + 2\log C$
- C) $3\log A \frac{1}{2}\log B 2\log C$
- D) $3\log A \frac{1}{2}\log B 4\log C$
- 8. Solve for x: $\log_6(5x+2) = \frac{1}{2}\log_6 64 + \log_6 3$

8.____

- A) $x = \frac{94}{5}$ B) $x = \frac{22}{5}$
- C) $x = \frac{26}{5}$ D) $x = \frac{9}{5}$
- 9. Write as a single logarithm $3[\log A + \log B] \log C$.

9.____

- A) $\log \frac{AB}{C^3}$
- B) $\log \left(\frac{AB}{C}\right)^3$
- C) $\log \frac{(AB)^3}{C}$
- D) $\log \frac{AB^3}{C}$

10. What is the value of $\log_2(4x)$ if $\log_2 x = 3$?

10.___

A) 5

B) 6

C) 7

- D) 12
- 11. If $\log_2 9 = x$, then $\log_2 \sqrt[5]{9^3}$ is equivalent to which expression?
- 11.___

A) $x^{\frac{3}{5}}$

B) $x^{\frac{5}{3}}$

c) $\frac{3x}{5}$

- D) $\frac{5x}{3}$
- 12. What is the *x*-intercept of $y = \log_2(x+7)$?

12.___

A) 1

B) -6

C) 8

- D) -7
- 13. What is the inverse of $y = 4^x$?

13.___

- A) $y = \log_{x} 4$
- $B) y = \log_4 x$
- C) $x = \log_4 y$ D) $x = \log_y 4$
- 14. \$3500 is invested in an account that pays 5.5% interest compounded quarterly. What is the balance after 8 years?

14.___

- A) \$5418.21
- B) \$8338.47
- C) \$3904.05
- D)\$10 836.42
- 15. Solve for x: $4^{x+1} = 5(3^{2x})$

15.___

- A) $\frac{\log 5 \log 4}{1 2\log 3}$ B) $\frac{\log 5 \log 4}{\log 4 2\log 3}$
- C) $\frac{-\log 4}{\log 4 2\log 15}$ D) $\frac{-\log 4}{1 2\log 15}$

Section B: Constructed Response.	Be sure to show all workings in order to receive full marks.
(17 marks)	

16. Solve for x:
$$\log_8(6x+2) + \log_8(x-3) = 2$$
 (5 marks)

17. The half life of plutonium-238 is 88 years. Suppose that a sample of plutonium has a mass of 65 grams. Write an exponential function and determine the time needed for the sample to

decay to a mass of 20 grams.
$$\left[A(t) = A_o \left(\frac{1}{2}\right)^{\frac{t}{h}}\right]$$

(4 marks)

18. One used car costs \$6000 and depreciates in value at 5% every 3 years, while another used car costs \$9000 and depreciates in value at a rate of 8% every 2 years. If both cars were purchased at the same time, when will the value of both be the same?		
	(5 marks)	
19. The intensity level β in decibels of a sound is defined by $\beta = 10(\log I + 12)$ where I is the intensity of the sound in watts per square metre. A fire truck siren has a decibel level of 118 dB. City traffic has a decibel level of 85dB. How many times as loud as city traffic is the fire truck siren?		
	(3 marks)	