

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. _____

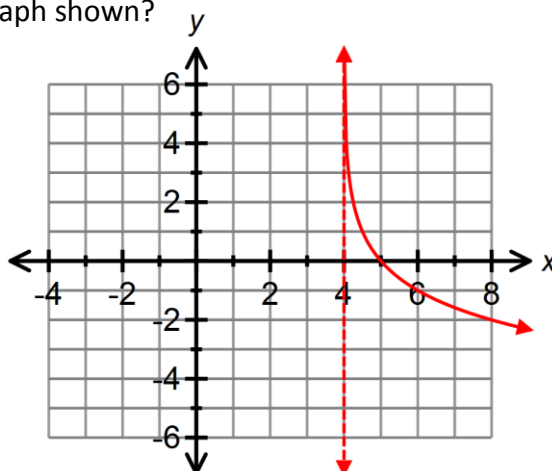
- A) $x > -6$ B) $x < -6$
 C) $x > 6$ D) $x < 6$

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 $\log \frac{A^3}{\sqrt{BC^4}}$?

7. _____

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) $\log \frac{AB^3}{C}$

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)