Algebra II Worksheet #3 Unit 11 Selected Solutions

Given: $\text{Log}_N 2 = a$; $\text{Log}_N 3 = b$; $\text{Log}_N 5 = c$. Express each of the following logarithms as an algebraic expression in terms of a, b, and/or c.

1. $\text{Log}_N 30 =$ **a + b + c**

$= \text{Log}_N [(2)(3)(5)] =$

$= \text{log}_N 2 + \text{Log}_N 3 + \text{Log}_N 5$

3. $\text{Log}_N 45 =$ **2b + c**

$= \text{Log}_N [(3^2)(5)] =$

$= 2\text{Log}_N 3 + \text{Log}_N 5$

5. $\text{Log}_N 0.8 =$ **2a – c**

$= \text{Log}_N \left(\frac{4}{5}\right) = \text{Log}_N 4 - \text{Log}_N 5 =$

$= \text{Log}_N 2^2 - \text{Log}_N 5$

$= 2\text{Log}_N 2 - \text{Log}_N 5$

7. $\text{Log}_N 0.3 =$ **b – a – c**

$= \text{Log}_N \left(\frac{3}{10}\right) = \text{Log}_N 3 - \text{Log}_N 10 =$

$= \text{Log}_N 3 - \text{Log}_N (2 \cdot 5) =$

$= \text{Log}_N 3 - (\text{Log}_N 2 + \text{Log}_N 5) =$

$= \text{Log}_N 3 - \text{Log}_N 2 - \text{Log}_N 5$

9. $\text{Log}_N 2.5 =$ **c – a**

$= \text{Log}_N (5/2) = \text{Log}_N 5 - \text{Log}_N 2$

11. $\text{Log}_N (6N) =$ **a + b + 1**

$= \text{Log}_N [(2)(3)(N)] =$

$= \text{Log}_N 2 + \text{Log}_N 3 + \text{Log}_N N$

13. $\text{Log}_N \sqrt{3} =$ **0.5b or b/2**

$= \text{Log}_N 3^{0.5} = 0.5\text{Log}_N 3$

15. $\text{Log}_N \left(\frac{3}{8}\right) =$ **b – 3a**

$= \text{Log}_N 3 - \text{Log}_N 8 =$

$= \text{Log}_N 3 - \text{Log}_N 2^3 =$

$= \text{Log}_N 3 - 3\text{Log}_N 2$

Evaluate each of the following.

19. $\text{Log}_8 4 =$ **2/3**

$4 = 8^{(2/3)}$

20. $\text{Log}_2 0.125 =$ **-3**

$0.125 = 1/8 = 2^{-3}$