
5.4 Practice – Properties of Logarithms

Name _____ Date _____ Period _____

Expand the following logarithmic functions.

1. $\log_2\left(\frac{x}{2}\right)^2$

2. $\log_5(70(x+3))$

3. $\log_4\left(\frac{x^4}{16}\right)$

4. $\log_{11}\left(\frac{6x^2}{14}\right)$

5. $\log_7\left(\frac{49(x+3)^2}{17}\right)$

6. $\log_3\left(\frac{(x+2)(x-3)}{(x+7)^2}\right)$

Condense the following logarithmic functions.

7. $3\log_3(x) + 6\log_3(7)$

8. $\log_6(x) - 2\log_6(2)$

9. $2\log(3) + 6\log(x)$

10. $2\log_4(x) + 3\log_4(3) - \log_4(7)$

11. $5\log_5(2) + 3\log_5(x) - \log_5(4)$

12. $2 + 3\log_7(x) - 2\log_7(6)$

Simplify.

13. $\log_3(18) - \log_3(2)$

14. $3\log_6(2) + 3\log_6(3)$

15. $\log_{\frac{1}{3}}(1) - \log_{\frac{1}{3}}(9)$

16. $\log_2(8) + \log_2(12) - \log_2(3)$

17. $3\log(2) + 3\log(5)$

18. $\log_4(2) + \log_4(8) + 2$

Express as a single logarithm. Simplify, if possible.

19. $\log_2 2^{x+5}$

20. $2.5^{\log_{2.5} 19}$

Given $\log_n a = 5$, $\log_n b = 4$, $\log_n c = 2$, and $\log_n d = 7$, estimate the value of the following logarithms.

21. $\log_n(a^2b)$

23. $\log_n\left(\frac{cd}{a}\right)$

22. $\log_n(bd)$

24. $\log_n\left(\frac{c}{b^2}\right)$