

#1-12

**PRACTICE** using the Properties of Logarithms

Write the expression as a SINGLE logarithm. SIMPLIFY, if possible.

1. $\log_2 14 - \log_2 7$	2. $\log_2 5 + \log_2 x - \log_2 10$	3. $2 \log 5 + \log 4$
4. $\log_3 3x - \log_3 9x + \log_3 6y$	5. $5 \log_2 x - 2 \log_2 y$	6. $4 \log_b x + \frac{1}{2} \log_b y - 3 \log_b 2z$

EXPAND the logarithm completely. SIMPLIFY, if possible.

7. $\log_3 8x^2y$	8. $\log\left(\frac{x}{9}\right)^5$	9. $\log_b \frac{b}{x}$
10. $\log \frac{x^2y^3}{z^4}$	11. $\log_4 4\sqrt{3x^3}$	12. $\log_3 \sqrt{\frac{m}{n^3}}$

EVALUATE without a calculator.

13. $\log 10^2$	14. $\log_9 9^{11} - \log_4 64$	15. $6^{\log_6 3} - \log_5 \frac{1}{25}$
16. $\log_3 8 \cdot \log_3 9$	17. $\log_4 48 - \frac{1}{2} \log_4 9$	18. $\frac{1}{2} \log_5 15 - \log_5 \sqrt{75}$