

Name _____ Date _____ Period _____

18.3 – Properties of Logarithms

Write each logarithmic expression as a single logarithm.

1. $4\log_6 10 - \log_6 3$

2. $4\log_2 x + \log_2 y$

3. $4\log_3 7 + 4\log_3 10$

4. $\log_5 x + 6\log_5 y$

5. $2\log_6 x - \log_6 y$

6. $5\log_3 x + 5\log_3 y$

7. $2\log_7 10$

8. $\log_8 10 + 5\log_8 3$

9. $\log_2 10 - 6\log_2 7$

10. $5\log_3 5 - \log_3 11$

Expand each logarithmic expression.

$$11. \log_6 \frac{x^5}{y}$$

$$12. \log_9 \frac{x}{y^6}$$

$$13. \log_3(6 \cdot 5^2)$$

$$14. \log_9(2 \cdot 3^4)$$

$$15. \log_7 \left(\frac{x}{y}\right)^2$$

$$16. \log_4(x \cdot y)^3$$

$$17. \log_2 \frac{x^4}{y}$$

$$18. \log_3(xy^5)$$

$$19. \log_9 \frac{x}{y^5}$$

$$20. \log(x^5y^5)$$