Name _____ Date _____

Algebra 2 and Trig – More Work with Logarithmic Laws **Homework**

Use the three log laws to expand each expression below as much as possible:

1. $\log 100ab^2$

2. $\log_4\left(\frac{64}{\sqrt{x}}\right)$

3. $\log\sqrt{\frac{b}{1000}}$

4. $\log_2\left(\frac{32x^8}{\sqrt[5]{y}}\right)$

Express each number as the product of primes and then expand the log as far as you can:

5. $\log_2 45$

6. $\log_5 20$

7. $\log_2 200$

8. $\log_6 576$

Express each of the following as the log of a single number and simplify.

9. $\frac{2}{3}\log_2 8$

10. $\log_6 12 + \log_6 3$

Write each expression as a single logarithm.

11. $2\log_5 x + \log_5 y$

12. $4\log_3 x - 3\log_3 y$

13. $\frac{1}{2}\log_{10} x + \frac{1}{3}\log_{10} y$

14. $3\log_2 x + \frac{1}{2}\log_2 y - \log_2 z$

15. $\frac{1}{2}\log_2 x - 3\log_2 y - 4\log_2 z$

16. $\frac{3}{2}\log x - \frac{3}{4}\log y - 5\log z$

17. $\frac{1}{3}(\log r + \log s) - 2\log t$

18. $3(\log_3 x + \log_3 y) - 5\log_3 z$

19. Evaluate each of the following:

a. $\log_6 36$

b. $\log_2 \frac{1}{16}$

c. $2\log_5 125 - 3\log_2 8$

d. $6\log_5 1 + 5\log_3 \frac{1}{27}$

e. $\log_{16} 2$

f. $\log_{\frac{1}{4}} \frac{1}{64}$

g. $\log \sqrt[3]{10}$

h. $\log_9 243$

20. Solve for x:

a. $\log_2 x = 5$

b. $\log_x 81 = \frac{4}{3}$

c. $\log_3 (x-2) = 2$

d. $\log_{27} 3 = x$