Section 6-2 : Logarithm Functions

For problems 1 – 5 write the expression in logarithmic form.

1. $11^{-3} = \frac{1}{1331}$

2. $4^{7} = 16384$

3. $\left(\frac{2}{7}\right)^{-3} = \frac{343}{8}$

4. $25^{\frac{3}{2}} = 125$

5. $27^{-\frac{5}{3}} = \frac{1}{243}$

For problems 6 – 10 write the expression in exponential form.

6. $\log_{\frac{1}{6}} 36 = -2$

7. $\log_{12} 20736 = 4$

8. $\log_{9} 243 = \frac{5}{2}$

9. $\log_{4} \frac{1}{128} = -\frac{7}{2}$

10. $\log_{8} 32768 = 5$

For problems 11 – 18 determine the exact value of each of the following without using a calculator.

11. $\log_{7} 343$

12. $\log_{4} 1024$

13. $\log_{\frac{3}{8}} \frac{27}{512}$

14. $\log_{11} \frac{1}{121}$

15. $\log_{0.1} 0.0001$

16. $\log_{16} 4$

17. $\log 10000$

18. $\ln \frac{1}{\sqrt[5]{\mathbf{e}}}$

For problems 19 – 20 write each of the following in terms of simpler logarithms

19. $\log_7 \left(10a^7 b^3 c^{-8}\right)$

20. $\log\left[z^2\left(x^2+4\right)^3\right]$

21. $\ln\left(\frac{w^2\sqrt[4]{t^3}}{\sqrt{t+w}}\right)$

For problems 22 – 24 combine each of the following into a single logarithm with a coefficient of one.

22. $7\ln t - 6\ln s + 5\ln w$

23. $\frac{1}{2}\log(z+1) - 2\log x - 4\log y - 3\log z$

24. $2\log_3(x+y) + 6\log_3 x - \frac{1}{3}$

For problems 25 & 26 use the change of base formula and a calculator to find the value of each of the following.

25. $\log_7 100$

26. $\log_{\frac{5}{7}} \frac{1}{8}$

For problems 27 – 31 sketch each of the given functions.

27. $g(x) = \ln(-x)$

28. $g(x) = \ln(x-3)$

29. $g(x) = \ln(x) + 7$

30. $g(x) = \ln(x+2) - 4$

31. $g(x) = \ln(x-6) + 2$