Preface

Here are a set of problems for my Algebra notes. These problems do not have any solutions available on this site. These are intended mostly for instructors who might want a set of problems to assign for turning in. I try to put up both practice problems (with solutions available) and these problems at the same time so that both will be available to anyone who wishes to use them.
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. \(\log_{\frac{5}{8}} \frac{27}{512}\)
14. \( \log_{11} \frac{1}{121} \)

15. \( \log_{0.1} 0.0001 \)

16. \( \log_{16} 4 \)

17. \( \log 10000 \)

18. \( \ln \frac{1}{\sqrt{e}} \)

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

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

20. \( \log \left[ z^2 (x^2 + 4)^{3/7} \right] \)

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

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. \( \log_7 \frac{1}{8} \)

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