Logs Test review

1. $9^{3x-7} = 9^{5x-x}$

$3x-7 = 5x-x$

$4x = 12 \Rightarrow x = 3$

2. $2^{w+4} \cdot 2^{w+6} = 2^{2w+1}$

$(w+4)+(w+6) = 2w+1$

3

3 $216 = 6^{2r-11}$

$6^3 = 6^{2r-11} \Rightarrow 3 = 2r-11$

$2r = 14$

$r = 7$

4. $2^{3k-1} \cdot 2^{5k-7} = 16$

$2^{(3k-1)+(5k-7)} = 2^4$

$8k-8 = 4$

$8k = 12 \Rightarrow k = 1.5$

5 $2^7 = 128$

6. $\log_8 512 = 3$

7- $3^{-3} = 1/27$

8. $\log_6 36 = 2 \log_6 6 = 2$

9. $\log_4 64 = \log_4 4^3 = 3 \log_4 4 = 3$

10 $\log_{16} 1/2 = \frac{\log_{10} 1/2}{\log_{10} 16} = -0.25$

11. $\log 1000 = \log_{10} 1000 = \log_{10} 10^3 = 3 \log_{10} 10 = 3$

12. $\log_{19} 1 = 0$

13. $\log_5 38 = \frac{\log_{10} 38}{\log_{10} 5} = 1.2920$

14. $\frac{1}{3}(\log_5 8 + \log_5 27) - \log_5 3$

$\log_5 (8 \times 27)^{1/3} - \log_5 3$

$= \log_5 6/3 = \log_5 2$

15. $2\log 6 - \frac{1}{4}\log 16 + \log 3$

$\log 36 - \log 2 + \log 3 = \log \frac{36 \times 3}{2} = \log 54$

16. $\log_2 \left(\frac{y}{z^5}\right)^2 = 2\left(\log_2 y + \log_2 z^5\right)$

17. $\log_3 \sqrt{m^5 n^2} = \frac{1}{4}\left(\log_3 m^5 + \log_3 n^2\right)$

18. $\log_7 (4n-7) = \log_7 (-3n)$

$4n - 7 = -3n$

$7n = 7 \Rightarrow n = 1$

19. $2\log (x-3) = \log 25$

$\log (x-3)^2 = \log 25$

$x^2 - 6x + 9 = 25$

$x^2 - 6x - 16 = 0$

$(x+2)(x-8)$ $x = -2, x = 8$

20. $\log_8 (28k - 20) + 1 = 18$

$\log_8 (28k-20) = \log_8 8^3 \Rightarrow 28k - 20 = 512$

$k = \frac{1}{28}(532) = 19$

21. $\log_2 4 + \log_2(c-9) = 5 = \log_2 2^5$

$\log_2 4(c-9) = \log_2 2^5$

$4c - 36 = 32$

$4c = 68$

$c = 17$

22. $e^x = 36$.

$x = \ln 36$

23. $e^{x-9} = 74$.

$x - 9 = \ln 74$

24. $\ln x = 18$

$x = e^{18}$

25. $\ln 87 = x + 4$

$87 = e^{x+4}$

26. $\ln 4 + \ln 3x = \ln 3x(4) = \ln 12x$

27. $\frac{1}{2} \ln 256 - 3 \ln 2$

$= \ln 16 - \ln 8 = \ln 16/8 = \ln 2$

28. $\ln 2m^8 = 8(\log 2 + \log m)$

29. $\ln \left(\frac{m^5}{n^2}\right)^3 = 3 \ln m^5 - \ln n^2$

30. $\ln(2x^2 - 15) = \ln(x^2 + 34)$

$2x^2 - 15 = x^2 + 34$

$x^2 = 49 \Rightarrow x = \pm 7$

31. $\ln 8 + \ln(n-9) = \ln 2^5$

$8(n-9) = 32$

$8n - 72 = 32$

$8n = 104 \quad n = 13$

32. $4e^{3k} + 1 = 85$

$4e^{3k} = 84$

$e^{3k} = 21$

$3k = \ln 21 \Rightarrow k = \frac{\ln 21}{3} = 1.0148$

$\frac{3k}{3} = \frac{\ln 21}{3}$

33. $3e^{4m-7} - 8 = 106$

$\frac{3}{3}e^{4m-7} = \frac{114}{3}$

$e^{4m-7} = 38$

$4m - 7 = \ln 38$

$4m - 7 = 3.638$

$4m = 10.638$

$m = 2.6594$