

1.6 Exercises #11-22, 29, 30

11. $\log_3 27$

rewrite w/ logs

$\log_3(3^3)$

$3 \log_3(3)$

$= 3$

w/ exponents

$3^3 = 27$

$3^? = 3^3$

$? = 3$

16. $\log_7(49^2)$

$\log_7(7^{2 \cdot 2})$

$4 \log_7 7$

$= 4$

21. $\ln(e^3) + \ln(e^4)$

$3 \ln e + 4 \ln e$

$3 + 4$

$= 7$

12. $\log_5 \frac{1}{25}$

$5^? = \frac{1}{25}$

$5^? = 5^{-2}$

$= -2$

17. $\log_8 2 + \log_4 2$

$8^x = 2$

$2^{3x} = 2^1$

$3x = 1$

$x = \frac{1}{3}$

$4^x = 2$

$2^{2x} = 2^1$

$2x = 1$

$x = \frac{1}{2}$

$\frac{1}{3} + \frac{1}{2} = \frac{2}{6} + \frac{3}{6} = \frac{5}{6}$

22. $\log_2 \sqrt[4]{3} + \log_2 24$

$\log_2 (\frac{4}{31} \cdot 24)$

$\log_2 32$

$= 5$

13. $\log_2 2^{5/3}$

$\frac{5}{3} \log_2 2$

$= \frac{5}{3}$

18. $\log_{25} 30 = \log_{25} \frac{5}{6}$

$\log_{25} (30 \cdot \frac{5}{6})$

$\log_{25} \frac{150}{6}$

$\log_{25} 25$

$= 1$

29. $\ln(x^4) - \ln(x^2) = 2$

$\ln(\frac{x^4}{x^2}) = 2$

$\ln(x^2) = \frac{8}{2}$

$x^2 = e^2$

$x = e$

14. $\log_2(8^{5/3})$

$\log_2(2^{5 \cdot \frac{5}{3}})$

$\log_2(2^{15/3})$

$5 \log_2 2$

$= 5$

19. $\log_4 48 - \log_4 12$

$\log_4 (48/12)$

$\log_4 4$

$= 1$

30. $\log_3 y + 3 \log_3(y^2) = 14$

$\log_3 y + \log_3(y^6) = 14$

$\log_3(y^7) = 14$

$7 \log_3 y = 14$

$\log_3 y = 2$

$3^2 = y$

$y = 9$

15. $\log_{64} 4$

$64^x = 4$

$4^{3x} = 4^1$

$3x = 1$

$x = \frac{1}{3}$

20. $\ln(\sqrt{e} \cdot e^{7/5})$

$\ln(e^{1/2} \cdot e^{7/5})$

$\ln(e^{1/2 + 7/5})$

$\ln e^{1.9}$

$= 1.9$