Exercises 6.3

2. (a) $10^{-1} = 0.1$ (b) $8^3 = 512$

4. (a) $3^4 = 81$ (b) $8^{2/3} = 4$

6. (a) $e^2 = x + 1$ (b) $e^4 = x - 1$

8. (a) $\log_{10} 10000 = 4$ (b) $\log_{81} 9 = \frac{1}{2}$

10. (a) $\log_8 \frac{1}{8} = -1$ (b) $\log_{10} n = m$

12. (a) $\ln 0.5 = x + 1$ (b) $\ln t = 0.5x$

14. (a) $\log_3 3 = 1$ (b) $\log_3 1 = \log_3 3^0 = 0$
    (c) $\log_3 3^2 = 2$

16. (a) $\log_2 32 = \log_2 2^5 = 5$ (b) $\log_8 8^{17} = 17$
    (c) $\log_6 1 = \log_6 6^0 = 0$

18. (a) $\log_5 125 = \log_5 5^3 = 3$ (b) $\log_{49} 7 = \log_{49} 49^{1/2} = \frac{1}{2}$
    (c) $\log_9 \sqrt{3} = \log_9 3^{1/2} = \log_9 \left(9^{1/2}\right)^{1/2} = \log_9 9^{1/4} = \frac{1}{4}$

20. (a) $e^{\ln \pi} = \pi$ (b) $10^{\log 5} = 5$
    (c) $10^{\log 87} = 87$

22. (a) $\log_4 \sqrt{2} = \log_4 2^{1/2} = \log_4 \left(4^{1/2}\right)^{1/2} = \log_4 4^{1/4} = \frac{1}{4}$
    (b) $\log_4 \left(\frac{1}{2}\right) = \log_4 2^{-1} = \log_4 \left(4^{1/2}\right)^{-1} = \log_4 4^{-1/2} = -\frac{1}{2}$
    (c) $\log_4 8 = = \log_4 2^3 = \log_4 \left(4^{1/2}\right)^3 = \log_4 4^{3/2} = \frac{3}{2}$

24. (a) $\log_5 x = 4 \quad \Leftrightarrow \quad x = 5^4 = 625$ (b) $x = \log_{10}(0.1) = \log_{10} 10^{-1} = -1$

26. (a) $\log_x 1000 = 3 \quad \Leftrightarrow \quad x^3 = 1000 \quad \Leftrightarrow \quad x = 10$
    (b) $\log_x 25 = 2 \quad \Leftrightarrow \quad x^2 = 25 \quad \Leftrightarrow \quad x = 5$

28. (a) $\log_x 6 = \frac{1}{2} \quad \Leftrightarrow \quad x^{1/2} = 6 \quad \Leftrightarrow \quad x = 36$
    (b) $\log_x 3 = \frac{1}{3} \quad \Leftrightarrow \quad x^{1/3} = 3 \quad \Leftrightarrow \quad x = 27$