

I. Change the expression to logarithmic form.

1. $3^4 = 81$ $\log_3 81 = 4$	2. $10^3 = 1000$ $\log_{10} 1000 = 3$
3. $2^x = 32$ $\log_2 32 = x$	4. $2^3 = x$ $\log_2 x = 3$

II. Change the expression to exponential form.

5. $\log_4 16 = 2$ $4^2 = 16$	6. $\log_5 125 = 3$ $5^3 = 125$
7. $\log_3 9 = 2$ $3^2 = 9$	8. $\log_6 6 = 1$ $6^1 = 6$

III. Evaluate

9. $\log_8 2 = x$ $8^x = 2$ $x = 1/3$	10. $\log_7 1 = x$ $7^x = 1$ $x = 0$	11. $\log 0.01 = x$ $10^x = .01$ $x = -2$
12. $\log_3 \frac{1}{81} = x$ $3^x = \frac{1}{81}$ $3^x = 3^{-4}$ $x = -4$	13. $\log_{1/2} 8 = x$ $\frac{1}{2}^x = 8$ $2^{-x} = 2^3$ $x = -3$	14. $\log_4 2 = x$ $4^x = 2$ $2^{2x} = 2^1$ $2x = 1$ $x = 1/2$
15. $\log_m m^3 = x$ $m^x = m^3$ $x = 3$	16. $\log_{27} 9 = x$ $27^x = 9$ $3^{3x} = 3^2$ $3x = 2$ $x = 2/3$	17. $\log_3 243 = x$ $3^x = 243$ $3^x = 3^5$ $x = 5$
18. $\log_{1/16} \frac{1}{8} = x$ $\frac{1}{16}^x = \frac{1}{8}$ $2^{-4x} = 2^{-3}$ $-4x = -3$ $x = 3/4$	19. $\log \sqrt{1000}$ $1.5$	20. $5^{\log_5 14}$ $14$
21. $\log_3 81 = x$ $3^x = 81$ $x = 4$	22. $\log_{15} 1 = x$ $15^x = 1$ $x = 0$	23. $\log_2 \frac{1}{16} = x$ $2^x = \frac{1}{16}$ $2^x = 2^{-4}$ $x = -4$
24. $\log_{1/3} 27 = x$ $\frac{1}{3}^x = 27$ $3^{-x} = 3^3$ $-x = 3$ $x = -3$	25. $\log_9 9 = x$ $9^x = 9$ $x = 1$	26. $\log_8 4 = x$ $8^x = 4$ $2^{3x} = 2^2$ $\frac{3x}{3} = \frac{2}{3}$ $x = 2/3$

IV. Solve

27. $\log_{1/2} 16 = x$ $\frac{1}{2}^x = 16$ $2^{-x} = 2^4$ $-x = 4$ $x = -4$	28. $\log_5 x = -2$ $5^{-2} = x$ $x = \frac{1}{25}$
29. $\log_m \frac{1}{27} = -3$ $m^{-3} = \frac{1}{27}$ $m^{-3} = 3^{-3}$ $m = 3$	30. $\log_x \sqrt[3]{7} = \frac{1}{3}$ $x^{1/3} = 7^{1/3}$ $x = 7$
31. $\log_{1/2} x = -6$ $\frac{1}{2}^{-6} = x$ $x = 64$	32. $\log_{64} 8 = x$ $64^x = 8$ $2^{6x} = 2^3$ $6x = 3$ $x = 1/2$

Odd Answers: 9) 1/3 11) -2 13) -3 15) 3 17) 5 19) 3/2 21) 4 23) -4 25) 1 27) -4 29) 3 31) 64