

Exponential form

Logarithmic form

**Equivalent Exponential and Logarithmic Forms**

For any positive base b , where $b \neq 1$:
 $b^x = y$ if and only if $x = \log_b y$

- 1** a. Write $5^3 = 125$ in logarithmic form.
 b. Write $\log_3 81 = 4$ in exponential form.

SOLUTION

- a. $5^3 = 125 \rightarrow 3 = \log_5 125$ *3 is the exponent and 5 is the base.*
 b. $\log_3 81 = 4 \rightarrow 3^4 = 81$ *3 is the base and 4 is the exponent.*

Write each equation in logarithmic form.

12. $11^2 = 121$ 13. $5^4 = 625$ 14. $3^5 = 243$ 15. $6^3 = 216$
 16. $6^{-2} = \frac{1}{36}$ 17. $7^{-2} = \frac{1}{49}$ 18. $27^{\frac{1}{3}} = 3$ 19. $16^{\frac{1}{4}} = 2$
 20. $\left(\frac{1}{4}\right)^{-3} = 64$ 21. $\left(\frac{1}{9}\right)^{-2} = 81$ 22. $\left(\frac{1}{3}\right)^2 = \frac{1}{9}$ 23. $\left(\frac{1}{2}\right)^3 = \frac{1}{8}$

Write each equation in exponential form.

24. $\log_6 36 = 2$ 25. $\log_{10} 1000 = 3$ 26. $\log_{10} 0.001 = -3$
 27. $\log_{10} 0.1 = -1$ 28. $3 = \log_9 729$ 29. $3 = \log_7 343$
 30. $\log_3 \frac{1}{81} = -4$ 31. $\log_2 \frac{1}{32} = -5$ 32. $-2 = \log_2 \frac{1}{4}$
 33. $-3 = \log_3 \frac{1}{27}$ 34. $\log_{121} 11 = \frac{1}{2}$ 35. $\log_{144} 12 = \frac{1}{2}$