

Rewrite each equation in exponential form.

1) $\log_8 64 = 2$

2) $\log_{11} 121 = 2$

3) $\log_4 64 = 3$

4) $\log_9 \frac{1}{3} = -\frac{1}{2}$

Rewrite each equation in logarithmic form.

5) $3^5 = 243$

6) $10^{-3} = \frac{1}{1000}$

7) $2^6 = 64$

8) $5^4 = 625$

Expand each logarithm.

9) $\log_4 (7\sqrt[3]{10 \cdot 3})$

10) $\log_5 (x^6 \cdot y)^2$

11) $\log_9 (z^5\sqrt[3]{x})$

12) $\log \frac{a^2}{b^4}$

Condense each expression to a single logarithm.

$$13) \log_8 w + \frac{\log_8 u}{2} + \frac{\log_8 v}{2}$$

$$14) \log_9 a + \log_9 b + 2 \log_9 c$$

$$15) 2 \log a + 6 \log b$$

$$16) 3 \log_9 u - 9 \log_9 v$$

Use a calculator to approximate each to the nearest thousandth.

$$17) \log_4 30$$

$$18) \log_5 6.4$$

$$19) \log_5 1$$

$$20) \log_3 62$$

$$21) \log_7 55$$

$$22) \log_5 43$$

$$23) \log_2 5.6$$

$$24) \log_4 1.68$$

$$25) \log 4.9$$

$$26) \log_2 29$$