

Logarithms Practice Problems

Use a calculator to approximate each to the nearest thousandth.

1) $\log_3 9$

2

2) $\log_2 28$

4.807

3) $\log_4 1.688$

0.378

4) $\log_2 6.4$

2.678

Rewrite each equation in exponential form.

5) $\log_{25} 5 = \frac{1}{2}$

$25^{1/2} = 5$

6) $\log_{14} 1 = 0$

$14^0 = 1$

7) $\log_{289} \frac{1}{17} = -\frac{1}{2}$

$289^{-1/2} = \frac{1}{17}$

8) $\log_{17} \frac{1}{289} = -2$

$17^{-2} = \frac{1}{289}$

Rewrite each equation in logarithmic form.

9) $361^{1/2} = 19$

$\log_{361} (19) = \frac{1}{2}$

10) $144^{1/2} = 12$

$\log_{144} (12) = 1/2$

11) $7^2 = 49$

$\log_7 (49) = 2$

12) $9^2 = 81$

$\log_9 (81) = 2$

Condense each expression to a single logarithm.

13) $6\log_6 c + \frac{\log_6 a}{3}$

$\log_6 (c^6 \sqrt[3]{a})$

14) $18\log_3 x + 3\log_3 y$

$\log_3 (x^{18} y^3)$

$$15) \log_7 x + \log_7 y + 4 \log_7 z$$

$$\log_7 (xyz^4)$$

$$17) 12 \log_5 x - 3 \log_5 y$$

$$\log_5 \left(\frac{x^{12}}{y^3} \right)$$

$$19) 6 \log_6 a - 3 \log_6 b$$

$$\log_6 \left(\frac{a^6}{b^3} \right)$$

$$21) 6 \log_4 a - 2 \log_4 b$$

$$\log_4 \left(\frac{a^6}{b^2} \right)$$

$$16) 6 \log_5 x + 2 \log_5 y$$

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

$$18) 2 \log x + 6 \log y$$

$$\log (x^2 y^6)$$

$$20) 3 \ln w + \frac{\ln u}{3}$$

$$\ln (w^3 \sqrt[3]{u})$$

$$22) 10 \log a + 2 \log b$$

$$\log (a^{10} b^2)$$

Expand each logarithm.

$$23) \log_3 (u^3 v^5)$$

$$3 \log_3 u + 5 \log_3 v$$

$$25) \log_3 \left(\frac{u}{v^5} \right)^6$$

$$6 \log_3 u - 30 \log_3 v$$

$$27) \log_8 (u^2 v^3)$$

$$2 \log_8 u + 3 \log_8 v$$

$$29) \log_3 (z^5 \sqrt{x})$$

$$5 \log_3 z + \frac{1}{2} \log_3 x$$

$$31) \ln \left(\frac{x^6}{y} \right)$$

$$3 \ln x - \ln y$$

$$24) \log_9 (x \cdot y \cdot z^4)$$

$$\log_9 x + \log_9 y + 4 \log_9 z$$

$$26) \log_8 \sqrt{x \cdot y \cdot z}$$

$$\frac{1}{2} \log_8 x + \frac{1}{2} \log_8 y + \frac{1}{2} \log_8 z$$

$$28) \ln (u^2 v^2)$$

$$2 \ln u + 2 \ln v$$

$$30) \log_9 (z^5 \sqrt[3]{x})$$

$$5 \log_9 z + \frac{1}{3} \log_9 x$$

$$32) \log_4 (x^2 \cdot y)^3$$

$$6 \log_4 x + 3 \log_4 y$$