

College Algebra

Lots of Logs

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1. Write the following in exponential form.

a) $\log_3 81 = 4$

b) $\log_{\frac{1}{2}} \frac{1}{8} = 3$

c) $\log_3 1 = 0$

d) $\log_6 \frac{1}{36} = -2$

2. Write the following in logarithmic form.

a) $4^2 = 16$

b) $x^{2y} = z + 1$

c) $\left(\frac{1}{2}\right)^{-5} = 32$

d) $\sqrt{x} = y$

3. Evaluate the given logarithms.

a) $\log_2 8$

b) $\log_{16} 4$

c) $\log_5 \frac{1}{5}$

d) $\log_3 1$

e) $7^{\log_3 3^{2x}} - \log_{2x} \left((2x)^{7^{2x}} \right)$

f) $16^{\log_2 2} - \log_x x^2$

4. Given that $\log_5 z = 3$ and $\log_5 y = 2$, evaluate each expression.

a) $\log_5 (y^2 z)$

b) $\log_5 \sqrt[3]{\frac{z}{y}}$

c) $\log_5(125y^7)$

d) $\frac{\log_5(125y^7)}{\log_5 25}$

e) $\log_5(25y^2) \log_5(z)$

f) $\log_5(25y^2z)$

5. Write each logarithm in expanded form.

a) $\log \sqrt[4]{xy}$

b) $\log \frac{xy}{z}$

c) $\log \frac{\sqrt{x} \sqrt[3]{y}}{z^4}$

d) $\log x \sqrt{z}$

e) $\log x \sqrt{\frac{\sqrt{x}}{z}}$

f) $\log \frac{\sqrt[3]{x^2 + x + 1}}{\sqrt[5]{y}}$

6. Write each logarithm in condensed form.

a) $\log_2 x + \log_2 7$

b) $\frac{1}{2} (\log x - \log y + \log z)$

c) $\frac{1}{5} (\log_2 z + 2 \log_2 y)$

d) $\frac{1}{3} (\log x - 2 \log y + 3 \log z)$

e) $2 \ln x - \frac{1}{2} \ln(x^2 + 1)$

f) $2 \ln x + \frac{1}{2} \ln(x^2 - 1) - \frac{1}{2} \ln(x^2 + 1)$

7. Solve the following logarithmic equations.

a) $\ln x = 3$

b) $\log x + \log(x - 1) = \log(4x)$

c) $\log_3(x + 25) - \log_3(x - 1) = 3$

d) $\log x + \log(x - 3) = 1$

e) $\log_2(x - 2) + \log_2(x + 1) = 2$

f) $\log_9(x - 5) + \log_9(x + 3) = 1$

8. Solve the following exponential equations.

a) $3^x - 2 = 12$

b) $3^{1-x} = 2$

c) $4^x = 8^{x+1}$

d) $\frac{10}{1 + e^{-x}} = 2$

e) $5^{2x+1} = 3^{x-1}$

f) $e^{x+1} = 3$