

3.4 expand/condense Logs Practice

Expand or condense the following logarithms.

1.) $\ln x^2 y^5 z$

$$2 \ln x + 5 \ln y + \ln z$$

2.) $\log_5 x + 2 \log_5 3 + \frac{1}{2} \log_5 y$

$$\log_5 x \cdot 3^2 \cdot y^{\frac{1}{2}}$$

$$\log_5 9x\sqrt{y}$$

3.) $3 \log_4 x - \log_4 (x+1) - \log_4 (x-1)$

$$\log_4 \frac{x^3}{(x+1)(x-1)}$$

4.) $\log_2 \frac{\sqrt{3x-5}}{7}$

$$\frac{1}{2} \log_2 (3x-5) - \log_2 7$$

5.) $\ln \sqrt{\frac{x^2}{y^3}}$

$$\frac{1}{2} [2 \ln x - 3 \ln y]$$

or

$$\ln x - \frac{3}{2} \ln y$$

6.) $\frac{1}{3} [2 \ln(x+3) + \ln x - \ln(x^2+1)]$

$$\frac{1}{3} \left(\ln \frac{(x+3)^2 \cdot x}{(x^2+1)} \right)$$

$$\ln \sqrt[3]{\frac{x(x+3)^2}{(x^2+1)}}$$

7.) $2\log 9 + \log(2x-5)$

$\log 9^2(2x-5)$

$\log 81(2x-5)$

8.) $\log \frac{y^4 \sqrt{x}}{z^3}$

$4\log y + \frac{1}{2}\log x - 3\log z$

9.) $\log_3 \frac{7}{m^2 n}$

$\log_3 7 - 2\log_3 m - \log_3 n$

10.) $5\log_3 x - \log_3 x - 7\log_3 y$

$\log_3 \frac{x^5}{xy^7}$
 $\log_3 \frac{x^4}{y^7}$

Evaluate the following logarithms. If necessary, round answers to four decimal places.

11.) $\log_{121} 11$

$121^? = 11$ $\frac{\log 11}{\log 121}$

$\frac{1}{2}$ $(.5)$

12.) $\log_5 17$

$\frac{\log 17}{\log 5}$

1.7604

13.) $\log_{\frac{1}{5}} 25$

$\frac{1}{5}^? = 25$

$\frac{\log 25}{\log (\frac{1}{5})}$

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Write each in its inverse form.

Log Form	Exponential Form
$\log_4 64 = 3$	14.) $4^3 = 64$
$\log 10000 = 4$	15.) $10^4 = 10,000$
16.) $\log_9 27 = \frac{3}{2}$	$9^{\frac{3}{2}} = 27$