

College Algebra

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Unit 3 - LT 3-4 Review

Date: _____ Period: _____

Rewrite each equation in its inverse form.

1) $\log_4 \frac{1}{16} = -2$

$\frac{1}{16} = 4^{-2}$

2) $36^{-\frac{1}{2}} = \frac{1}{6}$

$-\frac{1}{2} = \log_{36} \frac{1}{6}$

3) $\log 1000 = 3$

$1000 = 10^3$

4) $e^x = 8$

$x = \ln 8$

5) $\log_9 27 = \frac{3}{2}$

$27 = 9^{3/2}$

6) $\ln x = 5$

$x = e^5$

Evaluate each expression. ~~Show work!~~ If necessary, round answers to four decimal places.

7) $\log_7 82$

$\frac{\log(82)}{\log(7)} = 2.2646$

8) $\log_{32} 2$

$\frac{\log(2)}{\log(32)} = 0.2$

9) $\log_{\frac{1}{2}} 16$

$\frac{\log(16)}{\log(1/2)} = -4$

10) $\ln 9$

$= 2.1972$

11) $\log 10000$

$= 4$

12) $\log_5 \frac{1}{125}$

$\frac{\log(1/125)}{\log(5)} = -3$

Expand or condense the following logarithms.

13) $\ln \frac{x^2}{y^2 z^3}$

$$2 \ln x - (2 \ln y + 3 \ln z)$$

OR:

$$2 \ln x - 2 \ln y - 3 \ln z$$

14) $\log_6 3\sqrt{x}$

$$\log_6 3 + \log_6 x^{\frac{1}{2}}$$

$$\log_6 3 + \frac{1}{2} \log_6 x$$

15) $\log_3 x + \frac{1}{3} \log_3 y$

$$\log_3 x y^{\frac{1}{3}}$$

OR:

$$\log_3 x \sqrt[3]{y}$$

16) $\ln x - \ln y$

$$\ln \frac{x}{y}$$

17) $\ln \frac{4x^3}{y}$

$$\ln 4 + 3 \ln x - \ln y$$

18) $2 \ln 3 - 4 \ln y$

$$\ln 3^2 - \ln y^4$$

$$\ln 9 - \ln y^4$$

$$\ln \frac{9}{y^4}$$

19) $2 \log_4 x + \log_4 y$

$$\log_4 x^2 y$$

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

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

$$\ln \left(\frac{x^3}{(x+1)(x-1)} \right)^{\frac{1}{2}} \text{ OR } \ln \sqrt{\frac{x^3}{(x+1)(x-1)}}$$

21) $\log_4 5x^3y$

$$\log_4 5 + 3\log_4 x + \log_4 y$$

22) $3\log_4 x + 2\log_4 3 + \frac{1}{2}\log_4 y$

$$\log_4 x^3 \cdot 3^2 \cdot y^{\frac{1}{2}}$$

$$\log_4 9x^3 y^{\frac{1}{2}}$$

or:

$$\log_4 9x^3 \sqrt{y}$$

23) $2\ln 8 - 5\ln 2$

$$\ln 8^2 - \ln 2^5$$

$$\ln 64 - \ln 32$$

$$\ln \frac{64}{32}$$

$$\ln 2$$

25.) $6\ln x - 5\ln y - 3\ln z$

$$\ln \frac{x^6}{y^5 z^3}$$

26.) $\log_2 \sqrt[3]{\frac{x}{y}}$

$$\log_2 \left(\frac{x}{y}\right)^{\frac{1}{3}}$$

$$\frac{1}{3} \log_2 \frac{x}{y}$$

$$\frac{1}{3} [\log_2 x - \log_2 y]$$