

## 4.4 WS 4

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Use the properties of logarithms to expand the following logarithmic expressions. Assume all variable expressions represent positive real numbers. When possible, evaluate logarithmic expressions.

1.  $\log(x\sqrt{y^2z})$

2.  $\ln\left(\sqrt{\frac{x^3y}{x+10}}\right)$

3.  $\log_2\sqrt{xy^3\sqrt{8}}$

4.  $\log\left(\frac{x}{100\sqrt{z^3}}\right)$

5.  $\log\left(\frac{x^3z^{-1/2}}{y^{-5}}\right)$

6.  $\ln\left(\frac{ex}{\sqrt[4]{y}}\right)^5$

Use the properties of logarithms to rewrite each expression as a single logarithm with a coefficient of 1. Assume all variable expressions represent positive real numbers.

7.  $4\log x - \frac{1}{3}\log z$

8.  $\ln(x^2 + 5x + 6) - 2\ln(x + 3)$

9.  $\log(x^2 - 4) + \log y - 3\log(x + 2)$

Evaluate the logarithm. Round to the nearest ten-thousandth.

10.  $\log_2 5$

11.  $\log_e \pi$

12.  $\log_6 \sqrt{11}$

13.  $\log_e 13$

Find the inverse of each function, then state the domain and range of  $f^{-1}(x)$ .

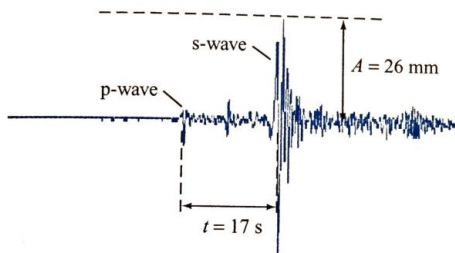
14.  $f(x) = \sqrt{7-x}$

15.  $f(x) = \frac{7}{3+x}$

16.  $f(x) = \frac{1}{3}x + 4$

17. Compare the intensity of an earthquake that measures 5.0 on the Richter scale to the intensity of an earthquake that measures 3.0 on the Richter scale by finding the ratio of the larger intensity to the smaller intensity.

18. Find the Richter scale magnitude of the earthquake that produced the seismogram in the following figure.



19. Vinegar has a hydronium-ion concentration of  $1.26 \times 10^{-3}$  mole per liter. Determine the pH of vinegar of magnesium and state whether vinegar is an acid or a base.