

## 4.4 WS 2

---

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.  $\log \frac{xz}{y^2}$

2.  $\ln(xy)^2$

3.  $\ln \sqrt{x\sqrt{y}}$

4.  $\ln(e^2z)$

5.  $\log_5 \left( \frac{x\sqrt{z}}{25y^2} \right)$

6.  $\ln \left( \sqrt[5]{x^3y\sqrt{z}} \right)$

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.  $\frac{1}{2} \ln y + \ln z - \frac{1}{2} \ln z$

8.  $2(\log_6 x + \log_6 y^2) - \log_6(x+2)$

9.  $\log_b(x^2 + 7x + 12) - 2\log_b(x+4)$

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

10.  $\log_2 6$

11.  $\log_{\sqrt{13}} 31$

12.  $\log_{12} \sqrt{3}$

13.  $\log_8 e$

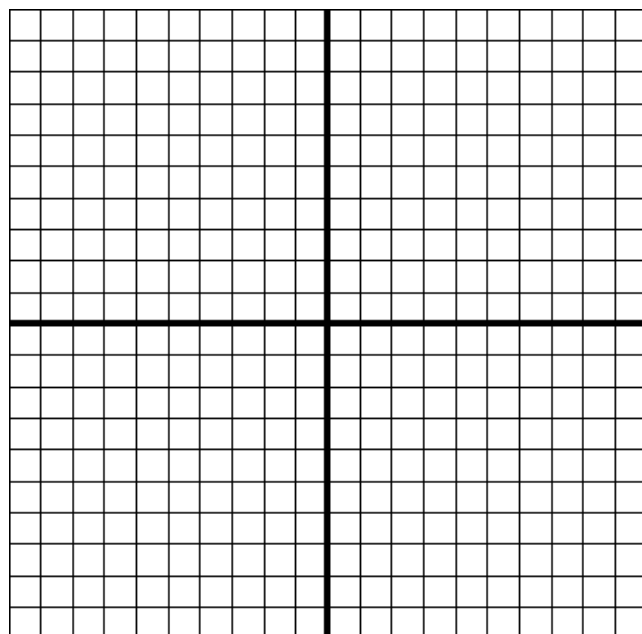
Find the inverse of each function, then state the domain and range of  $f^{-1}(x)$ .

14.  $f(x) = \sqrt{x+4}$

15.  $f(x) = \frac{1}{2}x + 6$

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

17. Graph:  $f(x) = \log_{1/9} x$



18. Graph:  $f(x) = \log x$

