

4.4 WS

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. $\log_2 \frac{\sqrt{x}}{y^3}$

2. $\log_b (x\sqrt[3]{y})$

3. $\log_7 \frac{\sqrt{xz}}{y^2}$

4. $\ln \sqrt{\frac{x}{x+5}}$

5. $\ln \left(\frac{m^2 n}{\sqrt{x+4}} \right)$

6. $\ln \left(\sqrt[3]{x^2 \sqrt{y}} \right)$

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. $2 \log x + \log y - \frac{1}{2} \log y$

8. $\ln(xy) + 3 \ln \left(\frac{y}{z} \right) - 2 \ln(xyz)$

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

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

10. $\log_8\left(\frac{3}{5}\right)$

11. $\log_9\sqrt{17}$

12. $\log_{\sqrt{2}}17$

13. $\log_{\pi}e$

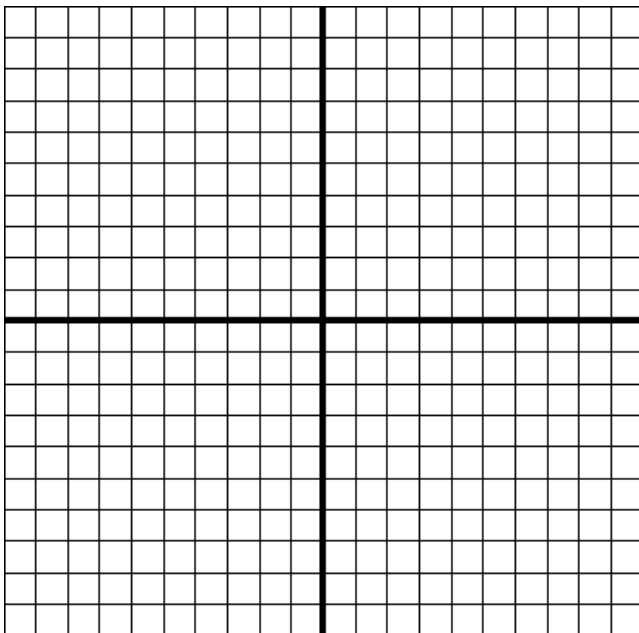
Find the domain of each of the following logarithmic functions.

14. $f(x) = \log(x-9)$

15. $f(x) = \log_7(x^2 - 9x + 18)$

16. $f(x) = \log_2\left(\frac{10}{x-8}\right)$

17. Graph: $f(x) = \log_2 x$



18. Graph: $f(x) = \log_{1/6} x$

