

Common Logarithmic Functions and Properties of Logarithms - Handout/Worksheet

NAME:

DATE:

1. Recall some properties of the exponential function:

(a) $b^{x+y} = b^x b^y$

(b) $b^{x-y} = \frac{b^x}{b^y}$

(c) $(b^x)^n = b^{nx}$

2. For all positive real numbers $0 < b \neq 1$, $x > 0$, $y > 0$, and real numbers n :

(a) $\log_b(x \cdot y) = \log_b(x) + \log_b(y)$

(b) $\log_b\left(\frac{x}{y}\right) = \log_b(x) - \log_b(y)$

(c) $\log_b(x^n) = n \cdot \log_b(x)$

1. Translate the logarithmic statement into an equivalent exponential statement

(a) $\log .0001 = -4$

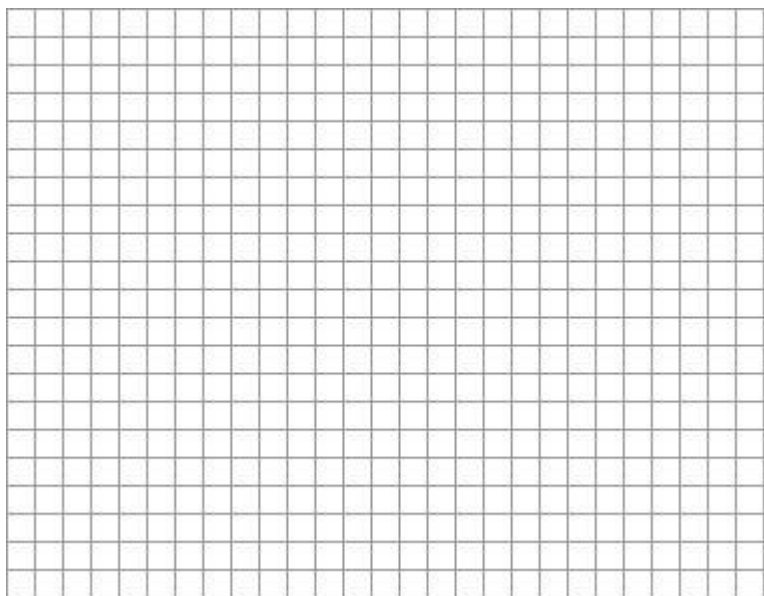
(b) $\ln 5 = 1.609$

2. Translate the exponential statement into an equivalent logarithmic statement

(a) $10^{-5} = 0.00001$

(b) $e^{1.56} = 4.759$

3. Sketch the graph of $2 \ln(x + 4)$ and state its domain.



4. Suppose $f(x) = A \ln x + B$ for some constants A and B and that $f(e) = 5$, $f(e^2) = 8$. Find A and B .

5. Use the rules for logarithms to write the expression as a single logarithm.

(a) $\ln x^3 - 5 \ln y$

(c) $\ln(e^4 x^2) - \ln(ey^3) + 2$

(b) $\log(t^2 - 64) - \log(t + 8)$

(d) $\log(10y^2) + \log(20x^2) - 1$

6. Let $u = \ln x$ and $v = \ln y$. Write $\ln\left(\frac{\sqrt{xy}}{x^2 y^3}\right)$ in terms of u and v .

7. Solve for x

(a) $10^{2x-8} = 0.01$

(c) $5^{x-7} = 2^x$

(b) $\log_2(x + 5) = \log_2(x + 3) + 4$

(d) $7^{2x+3} = 11^{3x-6}$