

Logarithmic Functions

11-21-07

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2. $2\ln 3 + \ln y$

6. $-2\log_2 x$

10. $3 + 4\log x$

14. $\log 5x$

18. $\log \sqrt[5]{x}$

22. $\log(x^9 y^5 z^4)$

26. 2.2362

30. $\frac{\ln x}{\ln 7}$

34. $\frac{\log x}{\log 4}$

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Properties of Logarithms

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Let b ($b \neq 1$), R , and S be positive real numbers and c be any real number.

- Product Rule:
- Quotient Rule:
- Power Rule:

1. Assuming x and y are positive, rewrite the expression as a sum or difference of logarithms or multiples of logarithms.

$$\log \frac{2}{y}$$

$$\log xy^3$$

$$\log \frac{\sqrt[3]{x}}{\sqrt[3]{y}}$$

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2. Assuming x , y , and z are positive, rewrite the expression as a single logarithm.

$$\ln x - \ln y$$

$$4\log y - \log z$$

$$4\ln(x^2y) - 5\ln(xy^3)$$

Change of Base Formula for Logarithms

For positive real numbers a , b , and x with $a \neq 1$ and $b \neq 1$.

$$\log_b x = \frac{\log_a x}{\log_a b}$$

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3. Use *change of base* and a calculator to evaluate.

$$\log_5 19$$

$$\log_{0.2} 29$$

4. Rewrite the expressions using natural logarithms.

$$\log_5 (c - d)$$

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5. Rewrite the expressions using common logarithms.

$$\log_{\frac{1}{3}}(x - y)$$