

A.5 Day 1 - Properties of Logarithms

Obj: To use properties of logs to simplify equations.

Take note

Properties Properties of Logarithms

For any positive numbers m , n , and b where $b \neq 1$, the following properties apply.

Product Property $\log_b mn = \log_b m + \log_b n$

Quotient Property $\log_b \frac{m}{n} = \log_b m - \log_b n$

Power Property $\log_b m^n = n \log_b m$

Must be memorized!!!

Feb 24-9:41 AM

Expand each logarithm

$$\log_5 xy$$

$$\log_5 x + \log_5 y$$

$$\log_3 7x^2$$

$$\log_3 7 + 2 \log_3 x$$

$$\log_3 7 + 2 \log_3 x$$

Mar 8-7:21 AM

Expand each logarithm

$$\log \frac{x^3}{y}$$

$$\log x^3 - \log y$$

$$3 \log x - \log y$$

$$\log_3 \sqrt{x}$$

$$\log_3 x^{\frac{1}{2}}$$

$$\frac{1}{2} \log_3 x$$

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What is each logarithm expanded?

A $\log \frac{4x}{y}$

$$\log 4x - \log y$$

$$(\log 4 + \log x) - \log y$$

b. $\log_3 9x^5$

$$\log_3 9 + \log_3 x^5$$

$$\log_3 9 + 5 \log_3 x$$

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Now, going the other way!

What is each expression written as a single logarithm?

A $\log_4 32 \ominus \log_4 2$

$$\log_4 \frac{32}{2}$$

$$\boxed{\log_4 16}$$

B $6 \log_2 x + 5 \log_2 y$

$$\log_2 x^6 \oplus \log_2 y^5$$

$$\boxed{\log_2 x^6 \cdot y^5}$$

Feb 24-9:43 AM

Write as a single logarithm

$$2 \log 6 - \log 4$$

$$\log 6^2 - \log 4$$

$$\log 36 \ominus \log 4$$

$$\log \frac{36}{4}$$

$$\boxed{\log 9}$$

$$\frac{1}{2} \log_3 25 + 4 \log_3 x$$

$$\log_3 25^{\frac{1}{2}} \oplus \log_3 x^4$$

$$\boxed{\log_3 5 \cdot x^4}$$

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Write as a single logarithm

$$\left(3\log_4 m + \frac{1}{2}\log_4 n\right) - \log_4 h$$

$$\left(\log_4 m^3 + \log_4 n^{1/2}\right) - \log_4 h$$

$$\log_4 m^3 \cdot \sqrt{n} - \log_4 h$$

$$\log_4 \frac{m^3 \cdot \sqrt{n}}{h}$$

Mar 14-8:23 AM