

Mar. 8, 2017

Sect. 5-4

Properties of Logarithms

Combine into a single log

Expand out to multiple logs

Basic Log Properties

$$\log_b 1 = 0$$

$$\log_b b^n = n$$

$$b^{\log_b n} = n$$

Other Properties

$$1. \log_b a + \log_b c = \log_b ac$$

$$2. \log_b a - \log_b c = \log_b \frac{a}{c}$$

$$3. m \log_b a = \log_b a^m$$

Write as a single log.

$$\log_3 2 + \log_3 x + 4 \log_3 y$$

$$\log_3 2 + \log_3 x + \log_3 y^4$$

$$\log_3 2 \times y^4$$

$$\log_5 3 - \log_5 x + 2\log_5 z - \frac{1}{3}\log_5 4$$

$$\log_5 3 - \log_5 x + \log_5 z^2 - \log_5 4^{\frac{1}{3}}$$

$$4^{\frac{1}{3}} = \sqrt[3]{4} \quad - \log_5 \sqrt[3]{4}$$

$$\log_5 \frac{3z^2}{x\sqrt[3]{4}}$$

Expand

$$\log_4 5x^3y$$

$$\log_4 5 + \log_4 x^3 + \log_4 y$$

$$\log_4 5 + 3\log_4 x + \log_4 y$$

$$\log_7 \frac{4x^2}{y}$$

$$\log_7 4 + \log_7 x^2 - \log_7 y$$

$$\log_7 4 + 2 \log_7 x - \log_7 y$$

Be Careful

$$\log_3(2x - 5)$$

~~$$\log_3 2 + \log_3 x - \log_3 5$$~~

No!

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