

Logaritmien laskusäännöt

$$\log_a x = y \Leftrightarrow a^y = x$$

MAFY

tulon logaritmi	$\log_a(xy) = \log_a x + \log_a y$
osamäärän logaritmi	$\log_a\left(\frac{x}{y}\right) = \log_a x - \log_a y$
potenssin logaritmi	$\log_a x^y = y \log_a x$
kantaluvun vaihto	$\log_a x = \frac{\log_b x}{\log_b a}$
luvun 1 logaritmi	$\log_a 1 = 0$
kantaluvun logaritmi	$\log_a a = 1$
kantaluvun potenssin logaritmi	$\log_a a^x = x$
saman kantaluven logaritmi eksponentissa	$a^{\log_a x} = x$

$$\log_2 20 - \log_2 5 = \log_2 \left(\frac{20}{5} \right) = \log_2 4 = \log_2 2^2 = 2 \cdot \log_2 2 = 2 \cdot 1 = 2$$

$$\log_a \left(\frac{x}{y} \right) = \log_a x - \log_a y, \quad \log_a x^y = y \log_a x, \quad \log_a a = 1$$

$$\begin{aligned} 3 \log_5 x + 2 \log_5 3 - \log_5 4 &= \log_5 x^3 + \log_5 3^2 - \log_5 4 \\ &= \log_5 9x^3 - \log_5 4 = \log_5 \left(\frac{9x^3}{4} \right) \end{aligned}$$

$$\begin{aligned}\log_9 36 - \log_3 2 &= \log_9 36 - \frac{\log_9 2}{\log_9 3} = \log_9 36 - \frac{\log_9 2}{\log_9 9^{\frac{1}{2}}} \\&= \log_9 36 - \frac{\log_9 2}{\frac{1}{2}} = \log_9 36 - 2 \cdot \log_9 2 = \log_9 36 - \log_9 2^2 \\&= \log_9 36 - \log_9 4 = \log_9 \left(\frac{36}{4} \right) = \log_9 9 = 1\end{aligned}$$