

Profion Logarithmau

$$(1) \log_a(xy) = \log_a(x) + \log_a(y)$$

Gadewch i $m = \log_a(x)$, $n = \log_a(y)$.

Yna $a^m = x$, $a^n = y$.

Felly $xy = a^m \times a^n$.

$xy = a^{m+n}$ (rheolau indecsau).

$\log_a(xy) = m + n$.

$\log_a(xy) = \log_a(x) + \log_a(y)$.

$$(2) \log_a\left(\frac{x}{y}\right) = \log_a(x) - \log_a(y)$$

Gadewch i $m = \log_a(x)$, $n = \log_a(y)$.

Yna $a^m = x$, $a^n = y$.

Felly $\frac{x}{y} = \frac{a^m}{a^n}$.

$\frac{x}{y} = a^{m-n}$ (rheolau indecsau).

$\log_a\left(\frac{x}{y}\right) = m - n$.

$\log_a\left(\frac{x}{y}\right) = \log_a(x) - \log_a(y)$.

$$(3) \log_a(x^k) = k \log_a(x)$$

Gadewch i $y = \log_a(x)$.

Yna $a^y = x$.

Felly $(a^y)^k = x^k$.

$a^{yk} = x^k$ (rheolau indecsau).

$yk = \log_a(x^k)$.

$ky = \log_a(x^k)$.

Felly $k \log_a(x) = \log_a(x^k)$

neu $\log_a(x^k) = k \log_a(x)$.