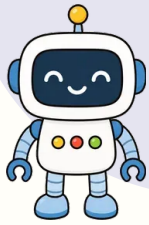
REFERENCE CHART

Laws of logarithms



What a logarithm asks

$\log_2 8 = 3$	What power of 2 makes 8?	$2^3 = 8$
$\log 1000$	A bare log is base 10; ln is base e.	$= 3$, because $10^3 = 1000$
Change of base	Divide two logs it has.	$\log_2 40 = \log 40 \div \log 2$

The three laws

× inside	Add the logs.	$\log 4 + \log 25 = \log 100 = 2$
÷ inside	Subtract the logs.	$\log 500 - \log 5 = \log 100 = 2$
Power inside	Bring it out in front.	$\log_2 8^3 = 3 \times \log_2 8 = 9$

Expand $\log(x^2y \div z)$ — one law at a time

1	Divide → subtract	$\log(x^2y) - \log z$
2	Multiply → add	$\log x^2 + \log y - \log z$
3	Power → out in front	$2 \log x + \log y - \log z$

Not this — this

$\log(x + y)$	is not $\log x + \log y$.	adding logs multiplies
$\log x \div \log y$	is not $\log(x \div y)$.	that one is $\log x - \log y$
$(\log x)^2$	is not $2 \log x$.	$2 \log x = \log x^2$
$\log 1$	is 0, not 1.	any base to the power 0 is 1