INKMATHS FLASHCARDS

Indices and log laws

10 cards · fronts and backs

Print double-sided, flipping on the long edge, and each answer lands behind its question. Cut along the card borders.

Definitions in precise wording, the standard results the formulae booklet does not print, a check-yourself question per topic, and the slips that lose marks. The same cards run on the website with spaced-repetition scheduling, at inkphysics.co.uk/maths/flashcards.

STANDARD RESULT

Laws of indices:

$a^m a^n = ?$, $(a^m)/(a^n) = ?$, $(a^m)^n = ?$

INDICES AND LOG LAWS

STANDARD RESULT

Negative and fractional indices:

$a^{-n} = ?$, $a^{m/n} = ?$, $a^0 = ?$

INDICES AND LOG LAWS

STANDARD RESULT

Exponential and log undo each other:

$e^{\ln x} = ?$, $\ln(e^x) = ?$

INDICES AND LOG LAWS

STANDARD RESULT

Product law:

$\log_a x + \log_a y = ?$

INDICES AND LOG LAWS

STANDARD RESULT

Quotient law:

$\log_a x - \log_a y = ?$

INDICES AND LOG LAWS

STANDARD RESULT

Power law:

$k \log_a x = ?$

INDICES AND LOG LAWS

DEFINITION

Define: Logarithm.

INDICES AND LOG LAWS

CHECK YOURSELF

Write 2 log 3 + log 4 as a single logarithm.

INDICES AND LOG LAWS

STANDARD RESULT

(1)/(a^n), the nth root of a, raised to m, 1

INDICES AND LOG LAWS

STANDARD RESULT

a^{m+n}, a^{m-n}, a^{mn}

INDICES AND LOG LAWS

STANDARD RESULT

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

INDICES AND LOG LAWS

STANDARD RESULT

x for x > 0, x for every x

INDICES AND LOG LAWS

STANDARD RESULT

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

INDICES AND LOG LAWS

STANDARD RESULT

$\log_a x - \log_a y = \log_a (x)/(y)$

INDICES AND LOG LAWS

CHECK YOURSELF

2 log 3 = log 9, and log 9 + log 4 = log 36.

INDICES AND LOG LAWS

DEFINITION

The power to which a must be raised to give x. So $a^y = x$ and y = log base a of x say the same thing, with $a > 0$, $a \neq 1$ and $x > 0$.

INDICES AND LOG LAWS

RECALL

State how to straighten an exponential or power model.

INDICES AND LOG LAWS

SPOT THE ERROR

Say what is wrong with this claim:

$\log(x + y)$ is the same as $\log x + \log y$.

INDICES AND LOG LAWS

SPOT THE ERROR

The product law says log x + log y = log(xy). A log turns a product into a sum. It does nothing at all to a sum, so log(x + y) stays as it is. Try x = y = 10. log 20 is about 1.3, and log 10 + log 10 = 2.

INDICES AND LOG LAWS

RECALL

For y = ax to the n, take logs of both sides to get log y = n log x + log a, so plot log y against log x. Gradient n, intercept log a. For y = ab to the x, plot log y against x instead. Gradient log b, intercept log a. Which axis gets the log is the whole question.

INDICES AND LOG LAWS