Factsheet: Laws of logarithms

Millie Pike

Summary

A list of laws of logarithms.

The associated study guide for this factsheet is Guide: Introduction to logarithms. If you would like to know more about logarithms, please read the guide.

Throughout this factsheet, a, k, x, and y are positive real numbers, and n is a real number, with $a, k \neq 1$.

Laws of logarithms

Law 1 - Product Rule:
$$\log_a(x) + \log_a(y) = \log_a(xy)$$

Law 2 - Quotient Rule:
$$\log_a(x) - \log_a(y) = \log_a(\frac{x}{y})$$

Law 3 - Power Rule:
$$\log_a(x^n) = n \log_a(x)$$

Law 4 - Zero Rule:
$$\log_a(1) = 0$$

Law 5 - Identity Rule:
$$\log_a(a) = 1$$

Law 6 - Change of Base Rule:

$$\log_a(x) = \frac{\log_k(x)}{\log_k(a)}$$

For more on the subject, please go to Guide: Introduction to logarithms

Version history

v1.0: created in 02/25 by Millie Pike as part of a University of St Andrews VIP project.