Logarithms and Powers in Any Base

Logarithm of a positive number to any base, natural, common and binary logarithms, and the base raised to a chosen power, with e to the same power.

Method: Change of base for logarithms

Input parameters

Unit system: SI

Parameter	Value	Unit
Number for the logarithms	250.00	
Base	5.0000	
Exponent for the powers	3.2000	

Calculated results

Parameter	Value	Unit
Logarithm to base b	3.4307	
Natural logarithm	5.5215	
Common logarithm	2.3979	
Binary logarithm	7.9658	
Base to the power y	172.47	
e to the power y	24.533	

Notes for this case

• Any logarithm follows from the natural one by the change of base log_b x = ln x/ln b. Logarithms turn products into sums, so they appear in decibels (10 $\log_{10}$), pH ($-\log_{10}$), entropy and LMTD, decay and half-lives (ln 2) and data ($\log_2$ for bits). Powers b^y are evaluated as e^(y ln b).

Formula and method

$$\log_b x = \frac{\ln x}{\ln b}, \quad b^y = e^{y \ln b}$$

Variables

x	Number for the logarithms	-
b	Base	-
y	Exponent for the powers	-
$\log_b x$	Logarithm to base b	-
$\ln x$	Natural logarithm	-
$\log_{10} x$	Common logarithm	-
$\log_2 x$	Binary logarithm	-
b^y	Base to the power y	-
e^y	e to the power y	-

Method and standards

Logarithms.

Assumptions and limits

- Real numbers; double precision.

References

Change of base for logarithms

Report details

Report reference	FCC-3F1F-7A51 (the same inputs always give the same reference)
Generated	23 November 2026, 18:08 UTC
Calculator	Logarithms and Powers in Any Base
Method last reviewed	17 November 2026
Software release	FireCAD Calc, release of 22 November 2026
Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/general/geometry/logarithm-exponent-calculator

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.