Logaritma

$2^3=8$, → $\log_2 8=3$

2 nin 3 üncü kuvveti 8 dir.

$\log_2 8=3$ 2 tabanına göre logaritma 8, 3 dur.

$10^2=100$ → $\log_{10}100=2$

$a^n=b$ → $\log_a b=n$

$a^1=a$ → $\log_a a=1$

pratik uygulamalarda logaritma 10 tabanına göre, mühendislik uygulamalarında logaritma e tabanına göre alınır. e=2.71828182846....

$\log_{10}A$ kısaca log A veya log(A) olarak gösterilir. taban yazılmamışsa 10 tabanına göre logaritma alındığı varsayılmış demektir.

e tabanına göre logaritma:

$\log_e A$ kısaca ln A veya ln(A) seklinde gösterilir.

Bu şekildeki değişik tabana göre alınan logaritmalar arasında

$$\log_e A = 2.3026 \log_{10} x$$

veya kısaca

$$\ln A = 2.3026 \log x$$

bağıntısı vardır.

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$a^1=a$ → $\log_a a=1$

$10^1=10$ → $\log_{10}10=1$

$e^1=e$ → $\log_e e=1$

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$A^n=B$ ise $\log_a A^n=\log_a B$

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$10^n=Q$ $\log_{10}10^n=\log_{10}Q$

$\log_{10}10^n=n$ dir çünkü

$10^1=10$ → $\log_{10}10=1$

$10^2=100 \rightarrow \log_{10}100=2$

$10^5=10^5 \rightarrow \log_{10}10^5=5$

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$10^n=B \rightarrow \log_{10}10^n=\log_{10}B \rightarrow n=\log_{10}B \rightarrow n=\log B$

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$e^n=B \rightarrow \log_e e^n=\log_e B \rightarrow n=\log_e B \rightarrow n=\ln B$

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$10^0=1$	$\log 1=0$
$10^1=10$	$\log 10=1$
$10^2=100$	$\log 100=2$
$10^3=1{,}000$	$\log 1{,}000=3$
$10^4=10{,}000$	$\log 10{,}000=4$
$10^5=100{,}000$	$\log 100{,}000=5$
$e^1=2.71828182846$	$\ln(2.71828182846)=\ln e=1$
$e^{\infty}=\infty$	$\ln\infty=\infty$
$e^{-\infty}=0$	$\ln 0=-\infty$
$e^0=1$	$\ln 1=0$
$e^{2.30258509299}=10$	$\ln 10=2.30258509299$

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

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

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

$$\log_a(\sqrt[n]{x})=(1/n)\log_a x \qquad \text{Where } \sqrt[n]{x}=x^{1/n}.$$

$$\log_b a=1/\log_a b$$

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Solve the equation $2^{3+x} = 2^{4x-9}$ for x.

You see that the bases (the twos) are the same, so the exponents must also be the same. You just solve the linear equation $3 + x = 4x - 9$ for the value of x: $12 = 3x$, or $x = 4$. You then put the 4 back into the original equation to check your answer: $2^{3+4} = 2^{4(4)-9}$, which simplifies to $2^7 = 2^7$, or $128 = 128$.

Many times, bases are related to one another by being powers of the same number.

Solve the equation $4^{x+3} = 8^{x-1}$ for x.

You need to write both the bases as powers of 2 and then apply the rules of exponents. The number 4 is equal to 2^2, and 8 is 2^3, so you can write the equation as: $\left(2^2\right)^{x+3} = \left(2^3\right)^{x-1}$.

The bases are the same, so set the exponents equal to one another and solve for x: $2x + 6 = 3x - 3$, which solves to give you $x = 9$. Substituting the 9 for x in the original equation, you get

$$\begin{aligned} 4^{9+3} &= 8^{9-1} \\ 4^{12} &= 8^{8} \\ 16{,}777{,}216 &= 16{,}777{,}216 \end{aligned}$$