logaritma

*üstel fonksiyon:

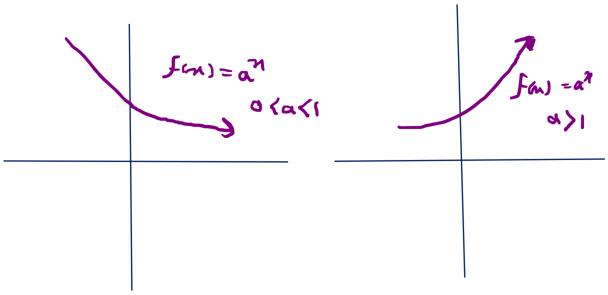
$a \in R^+ \setminus \{1\}$, $x \in R$ — $a > 1$ artan

$f: R \to R^+$ — $f(x) = a^x$ — $0 < a < 1$ azalan

الجواب

$y = a^x \Leftrightarrow \log_a^y = x$ — الأس — الأساس

$\left\} \begin{array}{l} a > 0 \\ a \neq 1 \\ y > 0 \end{array} \right.$



kurallar:

1] $\log_a^a = 1$

2] $\log_a^1 = 0 \quad a \neq 0$

3] $\log_a^{a^n} = n \log_a^a = n$

4] $\log_{b^n}^{a^m} = \frac{m}{n} \log_b^a$ العدد النيبري

5] $\log_e^x = \ln x \Leftrightarrow e^x \simeq 2{,}7$

6] $\log a = \log_{10}^a$

7] $\log 10^n = n \log 10 = n$

8] $\log_a^{x \cdot y} = \log_a^x + \log_a^y$

9] $\log_a^{\frac{x}{y}} = \log_a^x - \log_a^y$

10] $\log_a^b = \dfrac{\log_x^b}{\log_x^a}$

11] $\log_a^b = \dfrac{1}{\log_b^a} \to \Rightarrow \log_a^b = x \Rightarrow \log_b^a = \frac{1}{x}$

12] $\log_b^a \cdot \log_a^c \cdot \log_c^d = \log_b^d$

13] $\log_x^a = \log_x^b \Rightarrow a = b$

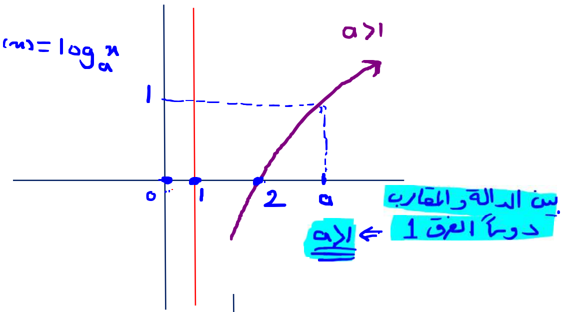
14] $y = a^x \Leftrightarrow \log_a^y = x$

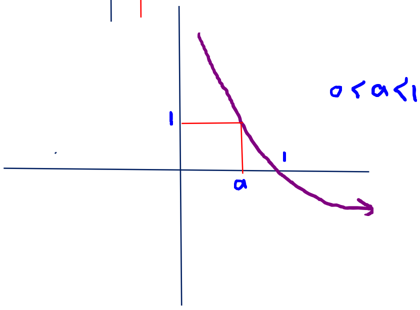
$\Rightarrow f^{-1}(x) = \log_a^x$

15] $\log_a^x < \log_a^y \xrightarrow{a>1} x < y$

16] $\log_a^x < \log_a^y \xrightarrow{0<a<1} x > y$

17] $f(x) = \log_a^x$





* Bayağı logaritması

$k \in Z \longrightarrow$ القسم الصحيح — charatestics

$0 \leq m < 1 \longrightarrow$ القسم الكسري — mantissa

$\log_{10}^A = \log A = k + m \longrightarrow$ ondalık kısım

↓ Tam kısım

örnekler

1] $\log x = -5{,}32$

$\hookrightarrow -5 - 0{,}32$

$-5 - 1 + 1 - 0{,}32$

$-6 \quad +0{,}68$ } $\bar{6},68$

2] $\log x = -3{,}1254 \Rightarrow \log \frac{1}{x^2}$

$\Rightarrow -2\log x \longrightarrow 2(3{,}1254)$

$6{,}2508$

3] $\log x = -3{,}216 \Rightarrow \log \sqrt[3]{x^4} = ?$

$\frac{4}{3}(-3 - 0{,}216)$

$-5 + 0{,}712$

$\bar{5},712$

* Cologaritma

$\log A = x$

$\text{Co}\log = -x$

$\text{colog}A = -\log A = \log \frac{1}{A}$

örnekler:

1] $\text{colog}\, x = \bar{2},3101 \Rightarrow \log x = ?$

$-2 - 0{,}3101$

$\Rightarrow -1{,}6899$

$\Rightarrow 1{,}6899$

2] $\text{Colog}\, 100 = -2$

3] $\log x = \bar{3},24$

$\Rightarrow \text{colog}\, x = ?$

$-\log x$

$\Rightarrow -\log x = -\bar{2} - 0{,}76$

$2{,}76$

örnekler:

1] $\log_5 8 \longrightarrow \log_{16} 125 = x$ ifadesenin x cinsinden eşit nedir

$\log_5 2 = \frac{y}{3}$ $\quad \frac{3}{4}\log_2 5 = x$

$\Rightarrow \log_2 5 = \frac{4x}{3}$

$\log_5 2 = \frac{3}{4x} = \frac{y}{3} \Rightarrow \frac{9}{4x} = y$

2] $\log 5 = x \longrightarrow \log 40 = ?$

$\log \frac{10}{2} = x \Rightarrow 1 + \log 2 = x$

$\log 2 = x - 1$

$\Rightarrow 2\log 2 + 1$

$\Rightarrow 2x - 1$

3] $\log_2 3 = a$ $\quad \log_5 2 = b \Rightarrow \log_2 15$ a, b cinsinden

$\hookrightarrow \log_2 5 = \frac{1}{b}$

$\Rightarrow \frac{\log_2 15^2}{\log_2 10} = \frac{2(a + \frac{1}{b})}{1 + \frac{1}{b}} = \frac{2ab + 2}{b + 1}$

4] $3^a = 5^b \Rightarrow \log_3 125$, (a, b) cinsinden

$\log_3 3^a = \log_3 5^b$

$\frac{a}{b} = \frac{\log 5}{\log 3}$ $\Big\}$ $\frac{3a}{2b}$

5]

$x = \log_5 3$ $\quad x, y, z$ sıralama?

$y = \log_{25} 16$ $\quad z > y > x$

$z = \log_{125} 216$

6] a, b, c, d sıralama?

$\log_2 3 = a \longrightarrow 2^1 < \; < 2^2 \rightarrow 1 < a < 2$

$\log_5 120 = b \longrightarrow 5^2 < \; < 5^3 \quad 2 < b < 3$

$\log_4 3 = c \longrightarrow 4^0 < \; < 4^1 \quad 0 < c < 1$

$\log_3 35 = d \longrightarrow 3^3 < \; < 3^4 \quad 3 < d < 4$

$d > b > a > c$

7] $x^{\ln x} = e^{2 + \ln x}$ $\quad$ ç.k = ?

ln alırsak $\Rightarrow$ $\ln x \cdot \ln x = \ln(e^2 \cdot x)$

$\ln x^2 = 2 + \ln x$

$t^2 - t - 2 = 0$

$\Rightarrow t = 2 \Rightarrow \ln x = 2 \Rightarrow x = e^2$

$t = -1 \Rightarrow \ln x = -1 \Rightarrow x = \frac{1}{e}$ $\Big\}$ ç.k $\{\frac{1}{e}, e^2\}$

8] $2 < \log_2(2x - 6) < 3 \Rightarrow$ ç.k = ?

$\Rightarrow 2^2 < 2x - 6 < 2^3$

$4 + 6 < 2x < 8 + 6 \Rightarrow$ ç.k = $(5, 7)$

$5 < x < 7$

$2x - 6 > 0$

$x > 3$ K

9] $f(x) = \log_2(x - 1) + 2$ $\quad$ ارسم الرسم البياني للدالة

$x - 1 > 0$

$x > 1$

x		2	3	5
$\log_2(x-1)$		0	1	2
$\log_2(x-1)+2$		2	3	4
		↗	↗	↗