

LOGARITMIYHTÄLÖ

esim 1 $\lg x = 4$ mj: $x > 0$

I tyyppi

$$\begin{aligned} \lg x &= 4 \\ \lg X &= 4 \cdot 1 \\ \lg x &= 4 \cdot \lg 10 \\ \lg x &= \lg 10^4 \\ x &= 10^4 = 10\,000 \\ &\in \text{mj.} \end{aligned}$$

$$\begin{aligned} \log_{10} 10^{10} &= 10 \\ \lg &= \log_{10} \quad (5.125) \\ \log x^r &= r \cdot \log x \end{aligned}$$

$$\begin{aligned} \log f(x) &= \log g(x) \\ f(x) &= g(x) \end{aligned}$$

$V: x = 10000$

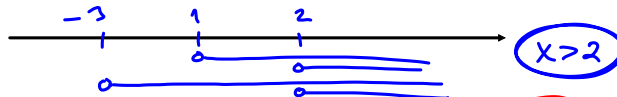
II tyyppi

$$\begin{aligned} \lg x &= 4 & \text{mj: } x > 0 \\ \log_{10} x &= 4 & \text{"logaritmin kantaluken korotettuna} \\ 10^4 &= x & \text{yhtälön oikean puolen lukua,} \\ x &= 10\,000 & \text{on määrittä olem. luku.} \\ &\in \text{mj.} & \end{aligned}$$

$V: 10000$

esim 2 $\ln(x-1) + \ln(x-2) + \ln(x+3) = \ln 6$

mj: $x-1 > 0$ jn $x-2 > 0$ jn $x+3 > 0$
 $x > 1$ jn $x > 2$ jn $x > -3$



$$\ln((x-1)(x-2)(x+3)) = \ln 6 \quad (5.125)$$

$$\ln(x^2 - 7x + 6) = \ln 6$$

$$x^2 - 7x + 6 = 6$$

$$x^2 - 7x + 6 - 6 = 0$$

$$x(x-7) = 0$$

NOLAN NOLLISÄÄNTÖ

$$x = 0 \text{ tai } x^2 - 7 = 0$$

$$x = 0 \text{ tai } x^2 = 7$$

$$\notin \text{mj.} \quad x = \pm\sqrt{7}$$

$$x = -\sqrt{7} \text{ tai } x = \sqrt{7} \approx 2,645... \in \text{mj.}$$

$V: x = \sqrt{7}$

esim 3

$$2^x = 7 \quad | \lg \quad \text{mj: } x \in \mathbb{R}$$

$$\lg 2^x = \lg 7$$

$$x \cdot \lg 2 = \lg 7 \quad | : \lg 2$$

$$x = \frac{\lg 7}{\lg 2}$$

$$x \approx 2,807...$$