14/2/2018

pg. 443 N 245

Calcolare i logaritmi

$\log_a b = x \iff a^x = b$

$\log_a b$: esponente da dare ad a per ottenere b

usiamo le proprietà dei logaritmi

$$\log_{\sqrt{2}} \frac{\sqrt[5]{4}}{8\sqrt{2}} = \log_{\sqrt{2}} \sqrt[5]{4} - \log_{\sqrt{2}} 8\sqrt{2} =$$

$$= \log_{\sqrt{2}} \sqrt[5]{4} - \left[\log_{\sqrt{2}} 8 + \underbrace{\log_{\sqrt{2}} \sqrt{2}}_{1}\right] =$$

$$= \log_{\sqrt{2}} 4^{\frac{1}{5}} - \log_{\sqrt{2}} 2^3 - 1 =$$

$$= \frac{1}{5} \log_{\sqrt{2}} 4 - 3 \log_{\sqrt{2}} 2 - 1 =$$

$$= \frac{1}{5} \cdot 4 - 3 \cdot 2 - 1 = \frac{4}{5} - 6 - 1 = \frac{4 - 30 - 5}{5} = \boxed{-\frac{31}{5}}$$

perché $\sqrt{2}^4 = 4$

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$$\log \frac{b \cdot \sqrt[3]{(a+3b)8}}{\sqrt{a+3b}} =$$

utilizzo le proprietà dei logaritmi

log senza base è $\log_{10}$

$$= \log b\sqrt[3]{(a+3b)8} - \log \sqrt{a+3b} =$$

$8 = 2^3$

$$= \log\left(2b\sqrt[3]{a+3b}\right) - \log\sqrt{a+3b} =$$

$$= \log 2 + \log b + \log \sqrt[3]{a+3b} - \log \sqrt{a+3b} =$$

$$= \log 2 + \log b + \log (a+3b)^{\frac{1}{3}} - \log (a+3b)^{\frac{1}{2}} =$$

$$= \log 2 + \log b + \frac{1}{3}\log(a+3b) - \frac{1}{2}\log(a+3b) =$$

$$= \log 2 + \log b + \left(\frac{1}{3} - \frac{1}{2}\right)\log(a+3b) =$$

$$= \log 2 + \log b - \frac{1}{6}\log(a+3b)$$

CAMBIAMENTO DI BASE

$$\log_a x = \frac{\log_n x}{\log_n a}$$

Lg. 445 N 282

$$\log_{0,11} 7 = \frac{\log 7}{\log 0,11} = \frac{0,84509804\ldots}{-0,958607314\ldots} = -0,881588392\ldots$$

$$\simeq -0,8816$$

$$\log_4 61 = \frac{\log 61}{\log 4} = 2,965368\ldots \simeq 2,9654$$

PROVA

$$\left[4^{2,9654} = 61,0026\ldots\right]$$

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$$\log_4 7 \cdot \log_7 16 = \frac{\cancel{\log 7}}{\log 4} \cdot \frac{\log 16}{\cancel{\log 7}} = \frac{\log 16}{\log 4} = \log_4 16 = 2$$

oppure, accorgendosi subito, si potevo usare $\log_2$

$$\log_4 7 \cdot \log_7 16 = \frac{\cancel{\log_2 7}}{\log_2 4} \cdot \frac{\log_2 16}{\cancel{\log_2 7}} = \frac{4}{2} = 2$$

EQUAZIONI LOGARITMICHE

Pg. 448 N 313

$$\log_5 x + \log_5 3 = \log_5 6$$

C.E.
$x > 0$
Gli argomenti dei logaritmi devono essere sempre > 0

$$\log_5 (x \cdot 3) = \log_5 6$$

$$\downarrow$$

$$3x = 6$$

$$x = \frac{6}{3} = 2$$

ok!

$\boxed{x = 2}$

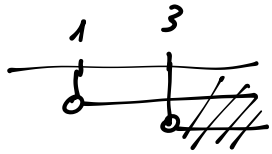
N 321

$$\log (x-1) + \log (x-3) = \log 8$$

C.E.

$$\begin{cases} x-1 > 0 \\ x-3 > 0 \end{cases}$$

$$\begin{cases} x > 1 \\ x > 3 \end{cases}$$



C.E. $\boxed{x > 3}$

$$\log (x-1)(x-3) = \log 8$$

$$(x-1)(x-3) = 8$$

$$x^2 - 3x - x + 3 - 8 = 0$$

$$x^2 - 4x - 5 = 0 \qquad \Delta = 16 + 20 = 36$$

$$x = \frac{4 \pm \sqrt{36}}{2} = \frac{4 \pm 6}{2} = \begin{cases} \frac{-2}{2} = -1 & \text{NON ACC.} \\ \frac{10}{2} = \boxed{5} \end{cases}$$

$\boxed{x = 5}$