

Logaritmos: propiedades

1. Aplica las propiedades y calcula el valor de cada una de las expresiones.

a. $\log_3 \frac{81}{243} =$

f. $\log_{1050} 1 =$

b. $\log_2 (32 \cdot 128) =$

g. $\ln \sqrt{e^4} =$

c. $\log_3 243^6 =$

h. $\ln e^5 =$

d. $9 \cdot \log_9 9 = \sqrt[9]{81} =$

i. $3 \cdot \log_{27} 243 =$

e. $\log_{453} 453 =$

j. $\log_{0,7} 0,49 =$

2. Calcula el valor de las expresiones.

a. $\log_4 64 + \log 1\,000 + \log_5 125$

d. $2 \cdot \log 100\,000 - 2 \cdot \log_4 256 + 4 \cdot \log_2 32$

b. $\log_7 49 - \log_{\frac{6}{5}} \frac{125}{216} + \log 10\,000$

e. $4 \cdot \log_{\frac{5}{7}} \frac{25}{49} + 2 \cdot \log_{\frac{2}{5}} \frac{8}{125} - 5 \cdot \log_{\frac{6}{7}} \frac{216}{343}$

c. $2 \cdot \log_5 25 - 3 \cdot \log^4 256 + 4 \cdot \log_8 4\,096$

f. $3 \cdot \log_{\frac{1}{4}} 16 + 7 \cdot \log_5 125 - 6 \cdot \log_{13} 2\,197$

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2. Calcula el valor de las expresiones.

a. $\log_4 64 + \log 1\,000 + \log_5 125$

$$\begin{aligned}\log_4 64 + \log 1\,000 + \log_5 125 \\= \log_4 4^3 + \log 10^3 + \log_5 5^3 \\= 3 + 3 + 3 \\= 9\end{aligned}$$

d. $2 \cdot \log 100\,000 - 2 \cdot \log_4 256 + 4 \cdot \log_2 32$

$$\begin{aligned}2 \cdot \log 100\,000 - 2 \cdot \log_4 256 + 4 \cdot \log_2 32 \\= 2 \cdot \log 10^5 - 2 \cdot \log_4 4^4 + 4 \cdot \log_2 2^5 \\= 2 \cdot 5 - 2 \cdot 4 + 4 \cdot 5 \\= 10 - 8 + 20 = 22\end{aligned}$$

b. $\log_7 49 - \log_{\frac{6}{5}} \frac{125}{216} + \log 10\,000$

$$\begin{aligned}\log_7 49 - \log_{\frac{6}{5}} \frac{125}{216} + \log 10\,000 \\= \log_7 7^2 + \log_{\frac{6}{5}} \left(\frac{6}{5}\right)^{-3} + \log 10^4 \\= 2 - 3 + 4 = 3\end{aligned}$$

e. $4 \cdot \log_{\frac{5}{7}} \frac{25}{49} + 2 \cdot \log_{\frac{2}{5}} \frac{8}{125} - 5 \cdot \log_{\frac{6}{7}} \frac{216}{343}$

$$\begin{aligned}4 \cdot \log_{\frac{5}{7}} \frac{25}{49} + 2 \cdot \log_{\frac{2}{5}} \frac{8}{125} - 5 \cdot \log_{\frac{6}{7}} \frac{216}{343} \\= 4 \cdot \log_{\frac{5}{7}} \left(\frac{5}{7}\right)^2 + 2 \cdot \log_{\frac{2}{5}} \left(\frac{2}{5}\right)^3 + 5 \cdot \log_{\frac{6}{7}} \left(\frac{6}{7}\right)^3 \\= 4 \cdot 2 + 2 \cdot 3 + 5 \cdot 3 \\= 8 + 6 + 15 = 29\end{aligned}$$

c. $2 \cdot \log_5 25 - 3 \cdot \log^4 256 + 4 \cdot \log_8 4\,096$

$$\begin{aligned}2 \cdot \log_5 25 - 3 \cdot \log_4 256 + 4 \cdot \log_8 4\,096 \\= 2 \cdot \log_5 5^2 - 3 \cdot \log_4 4^4 + 4 \cdot \log_8 8^4 \\= 2 \cdot 2 - 3 \cdot 4 + 4 \cdot 4 \\= 4 - 12 + 16 = 8\end{aligned}$$

f. $3 \cdot \log_{\frac{1}{4}} 16 + 7 \cdot \log_5 125 - 6 \cdot \log_{13} 2\,197$

$$\begin{aligned}3 \cdot \log_{\frac{1}{4}} 16 + 7 \cdot \log_5 125 - 6 \cdot \log_{13} 2\,197 \\= 3 \cdot \log_{\frac{1}{4}} \left(\frac{1}{4}\right)^{-2} + 7 \cdot \log_5 5^3 - 6 \cdot \log_{13} 13^3 \\= 3 \cdot (-2) + 7 \cdot 3 - 6 \cdot 3 \\= -6 + 21 - 18 = -3\end{aligned}$$