

LOGARITMOS Y EXPONENCIALES 1º B

1. Resuelve: $2 \cdot 4^{x+1} + 2^{x+2} - \frac{3}{2} = 0$

2. Resuelve: $\log(X+3) - \log(X+1) = 1 - \log 5$

3. Resuelve:
$$\begin{cases} x - 2y = 3 \\ \log(x+1) - \log y = 1 \end{cases}$$

4. Si $\log 2 = 0,3010$, $\log 3 = 0,4771$, $\log 5 = 0,6990$. Calcula:

a. $\log \sqrt[7]{\frac{1}{0,512}}$ b. $\log \frac{360}{1080}$

5. Escribe la expresión algebraica de: $\log A = 3 + 5 \log x - \frac{2}{5} \log(y) - 4 \log z + 3 \log x$

6. Resuelve:
$$\begin{cases} \log x - \log y = 1 \\ 2^{x-24} = 4^y \end{cases}$$

7. Resuelve $\frac{\log(1+x^2)}{\log(x-5)} = 2$

8. Resuelve $5^{3x^4 - 30x^2 + 29} = 25$

$$(1) 2 \cdot 4^{x+1} + 2^{x+2} - \frac{3}{2} = 0$$

$$2 \cdot (2^2)^{x+1} + 2^{x+2} - \frac{3}{2} = 0 \rightarrow 2 \cdot 2^{2x} \cdot 2^2 + 2^x \cdot 2^2 - \frac{3}{2} = 0 \rightarrow 8t^2 + 4t - \frac{3}{2} = 0$$

$$16t^2 + 8t - 3 = 0 \rightarrow t = \frac{-8 \pm \sqrt{64 + 192}}{2 \cdot 16} = \frac{-8 \pm \sqrt{256}}{32} = \frac{-8 \pm 16}{32} \rightarrow \begin{cases} \frac{-24}{32} = -\frac{3}{4} \text{ No} \\ \frac{8}{32} = \frac{1}{4} \end{cases}$$

$$2^x = -\frac{3}{4} \text{ No. } 2^x = \frac{1}{4} = 2^{-2} \rightarrow \boxed{x = -2}$$

$$(2) \log(x+3) - \log(x+1) = 1 - \log 5 \rightarrow \log \frac{x+3}{x+1} = \log \frac{10}{5} \rightarrow \frac{x+3}{x+1} = 2$$

$$x+3 = 2x+2 \rightarrow \boxed{x=1}$$

$$(3) \begin{cases} x - 2y = 3 \\ \log(x+1) - \log y = 1 \end{cases} \rightarrow \log \frac{x+1}{y} = \log 10 \rightarrow x+1 = 10y$$

$$\begin{cases} x - 2y = 3 \\ x + 1 = 10y \end{cases} \rightarrow \begin{cases} x - 2y = 3 \\ x - 10y = -1 \end{cases} \rightarrow \begin{cases} 8y = 4 \rightarrow y = \frac{1}{2} \\ x = 4 \end{cases}$$

$$x = 4, y = \frac{1}{2}$$

$$(4) a) \log \sqrt[7]{\frac{1}{0,512}} = \log \left(\frac{1000}{512} \right)^{1/7} = \frac{1}{7} [\log 1000 - \log 512] = \frac{1}{7} [3 - \log 2^9] =$$

$$= \frac{1}{7} [3 - 9 \log 2] = \frac{1}{7} [3 - 9 \cdot 0,3010] = 0,0416$$

$$b) \log \frac{360}{1080} = \log \frac{1}{3} = \log 1 - \log 3 = 0 - 0,4771 = -0,4771$$

$$(5) \log A = \log 1000 + \log x^5 - \log y^{2/5} - \log z^4 + \log x^3 = \log \frac{1000 \cdot x^5 \cdot x^3}{y^{2/5} \cdot z^4}$$

$$A = \frac{1000 x^8}{\sqrt[5]{y^2} z^4}$$

$$(6) \begin{cases} \log x - \log y = 1 \\ 2^{x-24} = 4y \end{cases} \rightarrow \begin{cases} \log \frac{x}{y} = \log 10 \rightarrow \frac{x}{y} = 10 \rightarrow x = 10y \\ 2^{x-24} = 2^{24} \rightarrow x - 24 = 24 \end{cases}$$

$$\begin{cases} 10y - 24 = 24 \\ 8y = 48 \rightarrow y = 6 \\ x = 60 \end{cases}$$

$$x = 60, y = 6$$

$$(7) \frac{\log(1+x^2)}{\log(x-5)} = 2 \rightarrow \log(1+x^2) = 2 \log(x-5) = \log(x-5)^2$$

$$1+x^2 = x^2 - 10x + 25 \rightarrow -24 = -10x \rightarrow x = \frac{24}{10} = \frac{12}{5} \text{ No } \sqrt{z} \leq 0$$

$$(8) 5 \cdot 3x^4 - 30x^2 + 29 = 25 = 5^2 \rightarrow 3x^4 - 30x^2 + 29 = 2$$

$$3x^4 - 30x^2 + 27 = 0 \quad x^2 = t$$

$$x = \frac{30 \pm \sqrt{900 - 324}}{6} = \frac{30 \pm \sqrt{576}}{6} = \frac{30 \pm 24}{6} = \begin{cases} 9 \\ 1 \end{cases}$$

$$t = 9 \rightarrow x = \pm 3$$

$$t = 1 \rightarrow x = \pm 1$$