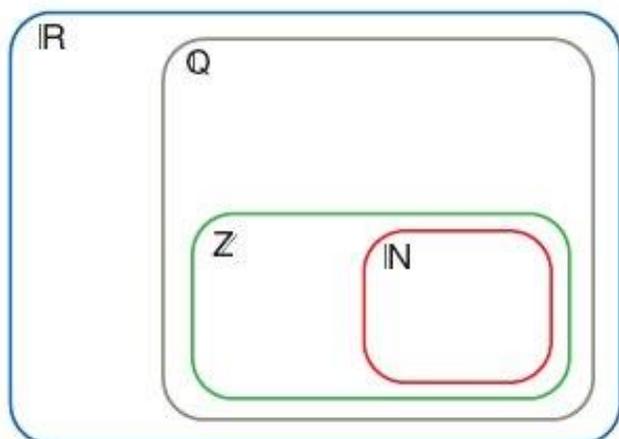


PREGUNTA 1: Sitúa los siguientes números en el diagrama: (1 punto)

$\sqrt{-3}$; $\sqrt{2}$; $\sqrt{25}$; $4,532\hat{1}$; $7,3$; $-\sqrt[3]{27}$; $\sqrt[3]{-27}$; π



PREGUNTA 2: Dados los intervalos:

$A = (-4, 2]$; $B = E\left(\frac{7}{2}, \frac{3}{2}\right)$; $C = \{x \in \mathbb{R} / x < 2\}$; $D = [3, 5]$; **calcular:** (1,5 puntos)

- a) $A \cup B$ b) $A \cap B$ c) $A \cup C$ d) $(A \cup B) \cap C$

PREGUNTA 3: Efectúa las siguientes operaciones y simplifica los resultados: (2 puntos)

- a) $\sqrt{20} \cdot \sqrt{45} \cdot \sqrt[5]{1024}$ b) $\sqrt{3^3 \sqrt{12a^8}}$
 c) $\frac{\sqrt{256}}{\sqrt[3]{16}}$ d) $\sqrt[4]{4} + \sqrt[6]{8} - \sqrt[12]{64} + \sqrt{12} - 7\sqrt{27}$

PREGUNTA 4: Racionaliza las siguientes fracciones, simplificando el resultado: (1,5 puntos)

- a) $\frac{3}{7\sqrt{5}}$ b) $\frac{\sqrt{3}}{8\sqrt[3]{2}}$ c) $\frac{\sqrt{5}}{2\sqrt{3}-\sqrt{5}}$

PREGUNTA 5: Calcula: (0,5 puntos)

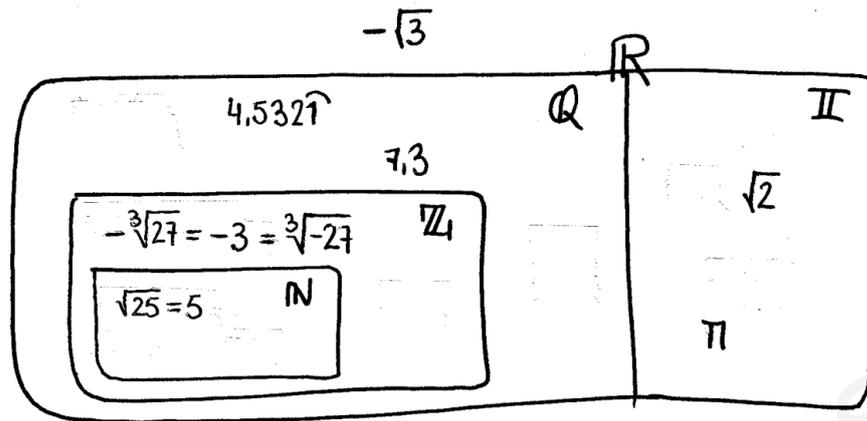
$$\log_3\left(\frac{1}{9}\right) + \log_{\frac{1}{2}}8 + \log_636 + \log_71$$

PREGUNTA 6: Resuelve:

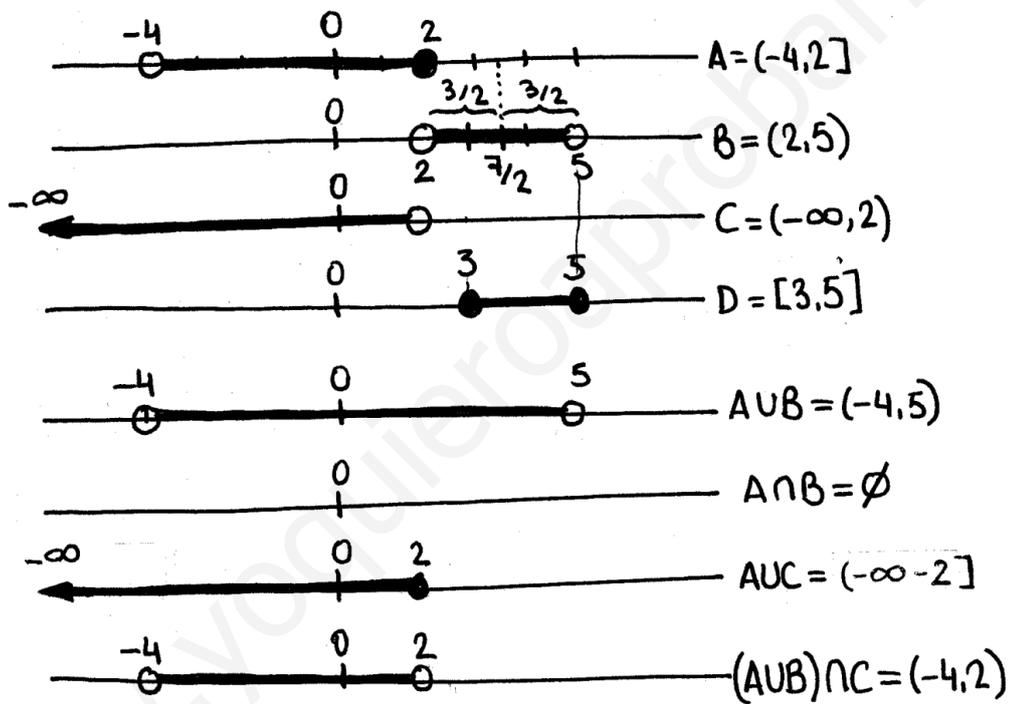
- a) $5^{2x} \cdot 25^x = 25^4$ (0,75 puntos) b) $\log(10x)^2 + \log\left(\frac{x}{100}\right) = 3$ (0,75 puntos)
 c) $\left. \begin{array}{l} 2^x + 3^y = 10 \\ 2^{x+1} + 3^{y+2} = 83 \end{array} \right\}$ (1 punto) d) $\left. \begin{array}{l} \log\left(\frac{x}{y}\right) = 1 \\ \log(x \cdot y) = 3 \end{array} \right\}$ (1 punto)

Sólo se valorarán las respuestas debidamente justificadas.

1.



2.



4.

$$\begin{aligned} \text{a) } \sqrt{20} \cdot \sqrt{45} \cdot \sqrt[5]{1024} &= \sqrt{2^2 \cdot 5} \cdot \sqrt{3^2 \cdot 5} \cdot \sqrt[5]{2^{10}} = \\ &= 2\sqrt{5} \cdot 3\sqrt{5} \cdot 2^2 = 24\sqrt{25} = 24 \cdot 5 = 120 \end{aligned}$$

$$\begin{aligned} \text{b) } \sqrt{3 \sqrt[3]{12a^8}} &= \sqrt{\sqrt[3]{3^3 \cdot 12a^8}} = \sqrt[6]{3^3 \cdot 2^2 \cdot 3 \cdot a^8} = \sqrt[6]{2^2 \cdot 3^4 \cdot a^8} = \\ &= \sqrt[3]{\sqrt{(2 \cdot 3^2 \cdot a^4)^2}} = \sqrt[3]{2 \cdot 3^2 \cdot a^4} = a \sqrt[3]{18a} \end{aligned}$$

$$\begin{aligned} \text{c) } \frac{\sqrt{256}}{\sqrt[3]{16}} &= \sqrt[6]{\frac{256^3}{16^2}} = \sqrt[6]{\frac{(2^8)^3}{(2^4)^2}} = \sqrt[6]{\frac{2^{24}}{2^8}} = \sqrt[6]{2^{16}} = \\ &= 2^2 \cdot \sqrt[6]{2^2} = 4 \cdot \sqrt[6]{4} \end{aligned}$$

$$\begin{aligned} \text{d) } \sqrt[4]{4} + \sqrt[6]{8} - \sqrt[12]{64} + \sqrt{12} - 7\sqrt{27} &= \\ &= \sqrt[4]{2^2} + \sqrt[6]{2^3} - \sqrt[12]{2^6} + \sqrt{2^2 \cdot 3} - 7\sqrt{3^3} = \\ &= \sqrt{2} + \sqrt{2} - \sqrt{2} + 2\sqrt{3} - 21\sqrt{3} = \sqrt{2} - 19\sqrt{3} \end{aligned}$$

$$5. \quad a) \quad \frac{3}{7\sqrt{5}} = \frac{3\sqrt{5}}{7\sqrt{5}\sqrt{5}} = \frac{3\sqrt{5}}{7 \cdot 5} = \frac{3\sqrt{5}}{35}$$

$$b) \quad \frac{\sqrt{3}}{8\sqrt[3]{2}} = \frac{\sqrt{3} \cdot \sqrt[3]{2^2}}{8\sqrt[3]{2} \cdot \sqrt[3]{2^2}} = \frac{\sqrt[6]{3^3} \cdot \sqrt[6]{2^4}}{8 \cdot \sqrt[3]{2^3}} = \frac{\sqrt[6]{3^3 \cdot 2^4}}{16}$$

$$c) \quad \frac{\sqrt{5}}{2\sqrt{3}-\sqrt{5}} = \frac{\sqrt{5}(2\sqrt{3}+\sqrt{5})}{(2\sqrt{3}-\sqrt{5})(2\sqrt{3}+\sqrt{5})} = \frac{2\sqrt{15}+5}{(2\sqrt{3})^2-(\sqrt{5})^2} = \frac{2\sqrt{15}+5}{12-5} =$$

$$= \frac{2\sqrt{15}+5}{7}$$

$$d) \quad \left(\frac{a+b}{\sqrt{a^2-b^2}} = \frac{(a+b)\sqrt{a^2-b^2}}{\sqrt{a^2-b^2} \cdot \sqrt{a^2-b^2}} = \frac{(a+b)\sqrt{a^2-b^2}}{a^2-b^2} = \right) \quad (no)$$

$$= \frac{(a+b)\sqrt{a^2-b^2}}{(a+b)(a-b)} = \frac{\sqrt{a^2-b^2}}{a-b}$$

$$6. \quad \log_3\left(\frac{1}{9}\right) + \log_{\frac{1}{2}} 8 + \log_6 36 + \log_7 1 =$$

$$= \log_3 1 - \log_3 9 + (-3) + 2 + 0 = 0 - 2 - 3 + 2 = -3$$

$$7. \quad a) \quad 5^{2x} \cdot 25^x = 25^4 ;$$

$$5^{2x} \cdot 5^{2x} = 5^8 ;$$

$$5^{4x} = 5^8 \Leftrightarrow 4x = 8 \Rightarrow x = 2$$

$$b) \quad \log(10x)^2 + \log\left(\frac{x}{100}\right) = 3 ;$$

$$2 \log(10x) + \log\left(\frac{x}{100}\right) = 3 ;$$

$$2(\log 10 + \log x) + (\log x - \log 100) = 3 ;$$

$$2 + 3 \log x - 2 = 3$$

(cont. 7b)

$$\log x = \frac{3}{3} = 1 \Rightarrow x = 10$$

$$c) \begin{cases} 2^x + 3^y = 10 \\ 2^{x+1} + 3^{y+2} = 83 \end{cases} \quad \begin{cases} 2^x + 3^y = 10 \\ 2 \cdot 2^x + 3^2 \cdot 3^y = 83 \end{cases}$$

CAMBIO DE VARIABLES:

$$\begin{cases} 2^x = A \\ 3^y = B \end{cases}$$

$$\begin{cases} A + B = 10 \\ 2A + 9B = 83 \end{cases} \quad \begin{cases} -2A - 2B = -20 \\ 2A + 9B = 83 \end{cases}$$
$$+ \quad \underline{\quad \quad \quad} \quad 7B = 63 \Rightarrow B = 9 \Rightarrow A = 1$$

DESHACEMOS LOS CAMBIOS:

$$\begin{aligned} A = 2^x = 1 &\Leftrightarrow \boxed{x = 0} \\ B = 3^y = 9 &\Leftrightarrow \boxed{y = 2} \end{aligned}$$

$$d) \begin{cases} \log\left(\frac{x}{y}\right) = 1 \\ \log(x \cdot y) = 3 \end{cases} \quad \begin{cases} \log x - \log y = 1 \\ \log x + \log y = 3 \end{cases}$$

c.v:

$$\begin{cases} \log x = A \\ \log y = B \end{cases}$$

$$\begin{cases} A - B = 1 \\ A + B = 3 \end{cases}$$
$$\underline{\quad \quad \quad} \quad 2A = 4 \Rightarrow A = 2 \Rightarrow B = 1$$

LUEGO:

$$\begin{aligned} A = \log x = 2 &\Leftrightarrow \boxed{x = 100} \\ B = \log y = 1 &\Leftrightarrow \boxed{y = 10} \end{aligned}$$