34681

1.- 1.- Resolver las siguientes inecuaciones:

a) $x-1-\frac{x-2}{x+3}\leq 1$ b) $-x^3+3x^2+x-3<0$ c) $\frac{3+x^2}{x^3-3x^2}\geq 0$

(a) $\frac{x(x+3)-(x+3)-(x-2)}{x+3}\leq 1 \Rightarrow \frac{x^2+3x-x-3-x+2}{x+3}\leq 1 \Rightarrow \frac{x^2+x-1}{x+3}-1\leq 0 \Rightarrow$

$\frac{x^2+x-1-x-3}{x+3}\leq 0 \Rightarrow \frac{x^2-4}{x+3}\leq 0$ $\boxed{\text{Sig } \frac{(x-2)(x+2)}{x+3}}$ $-$ $+$ $-$ $+$; -3 -2 2

Sol: $\forall x\in(-\infty,-3)\cup[-2,2]$

(b)

	-1	3	1	-3
1		-1	2	3
	-1	2	3	$\lfloor 0$
-1		1	-3	
	-1	3	$\lfloor 0$	

$-x^3+3x^2+x-3=+(x-1)(x+1)(-x+3)$

$\boxed{\text{Sig } (x-1)(x+1)(-x+3)}$ $+$ $-$ $+$ $-$; -1 1 3

Sol.: $\forall x\in(-1,1)\cup(3,\infty)$

(c) $\boxed{\text{Sig } \frac{3+x^2}{x^2(x-3)}}$ $-$ $-$ $+$; 0 doble 3

$\forall x\in(3,\infty)$

.- Resolver las ecuaciones exponenciales:

a. $9 - \frac{28}{3^x} = -3^{1-2x}$ *b.* $5^{x+1} + 5^x + 5^{x-1} = \frac{62}{5}$

(a) $3^x = z \Rightarrow 3^{2x} = z^2 \Rightarrow 3^{-2x} = z^{-2} = \frac{1}{z^2}$

$9 - \frac{28}{3^x} = -3 \cdot 3^{-2x} \Rightarrow 9 - \frac{28}{z} = -\frac{3}{z^2} \Rightarrow 9z^2 - 28z = -3$

$\Rightarrow 9z^2 - 28z + 3 = 0 \Rightarrow z = \frac{28 \pm \sqrt{784 - 108}}{18} \begin{cases} z = 3 \Rightarrow 3^x = 3 \Rightarrow x = 1 \\ z = \frac{1}{9} \Rightarrow 3^x = 3^{-2} \Rightarrow x = -2 \end{cases}$

(b) $\boxed{5^x = z}$

$5^x \cdot 5 + 5^x + 5^x \cdot 5^{-1} = \frac{62}{5}$

$5z + z + \frac{1}{5}z = \frac{62}{5}$

$z\left(5 + 1 + \frac{1}{5}\right) = \frac{62}{5}$

$z\left(\frac{31}{\cancel{5}}\right) = \frac{62}{\cancel{5}}$

$z = \frac{62}{31} = 2 \Rightarrow 5^x = 2$ $\ln 5^x = \ln 2 \Rightarrow x \ln 5 = \ln 2 \Rightarrow$

$x = \frac{\ln 2}{\ln 5}$

3.- Resolver las ecuaciones logarítmicas:

a) $\log(5x+4) - log2 = \frac{1}{2}\log(x+4)$ b) $(x^2 - x - 3) \cdot log4 = 3log\frac{1}{4}$

(a) $\log\frac{5x+4}{2} = \log\sqrt{x+4} \Rightarrow \left(\frac{5x+4}{2}\right)^2 = \left(\sqrt{x+4}\right)^2 \Rightarrow$

$\frac{25x^2+16+40x}{4} = x+4 \Rightarrow 25x^2 + \cancel{16} + 40x = 4x + \cancel{16} \Rightarrow 25x^2 + 36x = 0$

$\Rightarrow x(25x+36) = 0 \begin{cases} x = 0 \text{ válida} \\ x = -\frac{36}{25} \text{ no válida } \nexists \log - \end{cases}$

(b) $\log 4^{x^2-x-3} = \log\left(\frac{1}{4}\right)^3 \Rightarrow 4^{x^2-x-3} = 4^{-3} \Rightarrow x^2 - x - \cancel{3} = -\cancel{3} \Rightarrow$

$x^2 - x = 0 \Rightarrow x(x-1) = 0 \begin{cases} x = 0 \\ x = 1 \end{cases}$ válidas ambas

4.- Determinar el valor de : $\log_{\frac{1}{9}}\left(\frac{\sqrt[3]{9}}{3}\right) - \log\sqrt{10\sqrt[3]{0.1}} - Ln\sqrt{e} + \log_4\sqrt{2}$ $=(*)$

1) $\log_{\frac{1}{9}} \frac{\sqrt[3]{9}}{3} = z \Rightarrow \left(\frac{1}{9}\right)^z = \frac{\sqrt[3]{9}}{3} \Rightarrow 3^{-2z} = 3^{\frac{2}{3}-1} \Rightarrow 3^{-2z} = 3^{-\frac{1}{3}}$

$\Rightarrow -2z = -\frac{1}{3} \Rightarrow z = 1/6$

2) $\log\sqrt{10\sqrt[3]{0,1}} = \log\sqrt[6]{10^3\cdot 10^{-1}} = \log\sqrt[6]{10^2} = \log\sqrt[3]{10} = \frac{1}{3}$

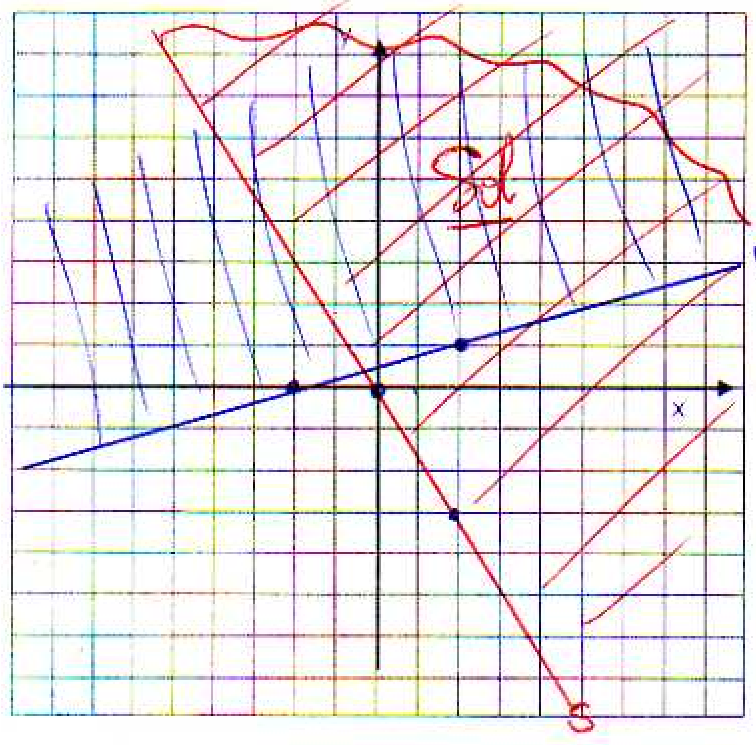
3) $\ln\sqrt{e} = \ln e^{1/2} = 1/2$

4) $\log_4\sqrt{2} = z \Rightarrow 4^z = \sqrt{2} \Rightarrow 2^{2z} = 2^{1/2} \Rightarrow 2z = \frac{1}{2} \Rightarrow z = \frac{1}{4}$

$=(*)\ \frac{1}{6} - \frac{1}{3} - \frac{1}{2} + \frac{1}{4} = \frac{2 - \cancel{4} - 6 + \cancel{3}}{12} = -\frac{5}{12}$

5.- Resuelve el siguiente sistema de inecuaciones

$$\begin{cases} -x + 4y > 2 & r \\ 3x + 2y \geq 0 & s \end{cases}$$



r $\equiv -x + 4y = 2$.

x	y
-2	0
2	1

$O(0,0)$ $0 > 2$ NO

s $\equiv 3x + 2y = 0$.

x	y
0	0
2	-3

$P(-1,0)$ $-3 \geq 0$ NO