**1.-Resolver las siguientes ecuaciones exponenciales:** (2 puntos)

a) $9^{2x-1} + 5 = 8 \cdot 3^{2x-1}$ 

b) $4^{3x} = 5^{x-1}$ 

c) $e^{Ln2x} = -\log_{\frac{1}{5}} 25$

(a) $9^{2x} \cdot 9^{-1} + 5 = 8 \cdot 3^{2x} \cdot 3^{-1} \Rightarrow \dfrac{3^{4x}}{9} + 5 - \dfrac{8}{3} \cdot 3^{2x} = 0$  $\boxed{t = 3^{2x}}$

$\dfrac{1}{9} t^2 - \dfrac{8}{3} t + 5 = 0 \Rightarrow t^2 - 24t + 45 = 0$

$t = \dfrac{24 \mp 20}{2}$

$t = 22 \Rightarrow 3^{2x} = 22 \Rightarrow 2x L3 = L22 \Rightarrow x = \dfrac{L22}{2L3} = \dfrac{L22}{L9}$ //

$t = 2 \Rightarrow 3^{2x} = 2 \Rightarrow 2x L3 = L2 \Rightarrow x = \dfrac{L2}{2L3} = \dfrac{L2}{L9}$ //

(b) $L 4^{3x} = L 5^{x-1} \Rightarrow 3x L4 = (x-1) L5 \Rightarrow 3x L4 = x L5 - L5 \Rightarrow$

$3x L4 - x L5 = -L5 \Rightarrow x(3L4 - L5) = -L5 \Rightarrow x = \dfrac{-L5}{3L4 - L5}$ //

(c) $\log_{1/5} 25 = x \Rightarrow \left(\dfrac{1}{5}\right)^x = 25 \Rightarrow 5^{-x} = 5^2 \Rightarrow -x = 2 \Rightarrow x = -2$.

$e^{Ln2x} = -\log_{1/5} 25 \Rightarrow e^{L2x} = +2 \Rightarrow L e^{L2x} = L2 \Rightarrow L2x \cdot \overset{1}{\underset{\|}{L e}} = L2$

$\Rightarrow L2x = L2 \Rightarrow 2x = 2 \Rightarrow x = 1$ //

**2.- Resolver la ecuación logarítmica:** $(x^2 - 4x + 7)\log 5 + \log 16 = 4$ (1 punto)

$\log 5^{x^2 - 4x + 7} + \log 16 = \log 10^4$

$\log 5^{x^2 - 4x + 7} \cdot 16 = \log 10^4$

$5^{x^2 - 4x + 7} \cdot 16 = 10^4$

$5^{x^2 - 4x + 7} = \dfrac{2^4 \cdot 5^4}{2^4}$

$x^2 - 4x + 7 = 4 \Rightarrow x^2 - 4x + 3 = 0$

$x = \dfrac{4 \pm \sqrt{16 - 12}}{2}$

$x_1 = 3$ válida

$x_2 = 1$ válida

3.-Hallar el **dominio** de definición de las siguientes funciones: (2,5 puntos)

a) $f(x)=\sqrt{\dfrac{x^4+x^2-2}{2-x}}$  b) $f(x)=\dfrac{2x-1}{\sqrt{x^5+2x^3}}$  c) $f(x)=\dfrac{2Ln(x^2-1)+x}{x-3}$  d) $f(x)=\dfrac{\sqrt{x^2-2x}}{\sqrt{x+4}}$

(a) $\dfrac{x^4+x^2-2}{2-x}\geq 0 \Rightarrow$ $\boxed{sig\ \dfrac{(x-1)(x+1)\cdot(x^2+2)}{(2-x)}}$

$x^4+x^2-2=0 \Rightarrow t=x^2 \Rightarrow t^2+t-2=0 \Rightarrow t=\dfrac{-1\pm\sqrt{1+8}}{2}$

$t=1 \Rightarrow x^2=1 \begin{cases} x=+1 \\ x=-1 \end{cases}$

$t=-2 \Rightarrow x^2=-2 \ \not\exists$

$Dom\ f(x)=(-\infty,-1]\cup[1,2)$

(b) $x^5+2x^3>0 \Rightarrow x^3(x^2+2)>0$ $\boxed{sig\ x^3(x^2+2)}$

$Dom\ f(x)=[0,+\infty)$ $(x^2+2=0 \Rightarrow x^2=-2 \Rightarrow no\ sol)$

(c) $f(x)=\dfrac{2ln(x^2-1)+x}{x-3} \begin{cases} ln \\ D \end{cases}$
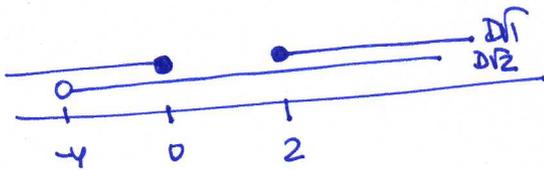
$x^2-1>0 \Rightarrow$ $\boxed{sig\ (x-1)(x+1)}$

$Dln=(-\infty,-1)\cup(1,\infty)$

$x-3=0 \Rightarrow x=3$ quitamos

$Df(x)=(-\infty,-1)\cup(1,3)\cup(3,+\infty)$

(d) $f(x)=\dfrac{\sqrt{x^2-2x}}{\sqrt{x+4}} \begin{cases} x(x-2)\geq 0. \quad \boxed{sig\ x(x-2)} \quad D\sqrt{1}=(-\infty,0]\cup[2,\infty) \\ \\ x+4>0 \quad D\sqrt{2}=(-4,\infty) \end{cases}$

$Dom\ f(x)=(-4,0]\cup[2,+\infty)$