1.- **(2,5 ptos)** Resolver por el método de Gauss: $\begin{cases} 2x+5y-2z=10 \\ x+2y-2z=4 \\ 4x+9y-6z=18 \end{cases}$

2.- a) **(1,25 ptos)** Simplificar y operar: $\dfrac{2x-8x^2}{16x^2-1} \cdot \dfrac{16x^2+8x+1}{6x} =$

b) **(1,25 ptos)** Desarrollar la expresión: $x - |2 - x| + 3 \cdot |x + 2| =$

3.- a) **(1,25 ptos)** Resolver: $\dfrac{\log(16-x^2)}{\log(3x-4)} = 2$

b) **(1,25 ptos)** Resolver: $4^x + 2^{2x-1} = 24$

4.- a) **(1,25 ptos)** Desarrollar por el binomio de Newton: $(2x^3y - 3xy^3)^5 =$

b) **(1,25 ptos)** Demostrar la propiedad de los logaritmos:

$$log_a M - log_a N = log_a \frac{M}{N}$$

① $\begin{cases} 2x+5y-2z=10 \\ x+2y-2z=4 \\ 4x+9y-6z=18 \end{cases} \xrightarrow{E_2 \leftrightarrow E_1} \begin{cases} x+2y-2z=4 \\ 2x+5y-2z=10 \\ 4x+9y-6z=18 \end{cases} \xrightarrow[E_3-4E_1]{E_2-2E_1}$

$\longrightarrow \begin{cases} x+2y-2z=4 \\ / \quad y+2z=2 \\ / \quad \cancel{y+2z=2} \end{cases} \longrightarrow \begin{cases} x+2y-2z=4 \\ y+2z=2 \end{cases} \longrightarrow \underline{z=t}$

$E_2: y+2t=2 \Rightarrow \underline{y=2-2t}$

$E_1: x+2(2-2t)-2\cdot t=4 \Rightarrow x+\cancel{4}-4t-2t=\cancel{4} \Rightarrow \underline{x=6t}$

$\boxed{S:(6t, 2-2t, t) \ \forall t \in \mathbb{R}}$

② a) $\dfrac{2x-8x^2}{16x^2-1} \cdot \dfrac{16x^2+8x+1}{6x} = \dfrac{\cancel{2x(1-4x)}^{(-1)}}{\cancel{(4x+1)}\cancel{(4x-1)}} \cdot \dfrac{(4x+1)^{\cancel{2}}}{\cancel{6x}_{3}} =$

$= \boxed{\dfrac{-(4x+1)}{3}}$

b) $x-|2-x|+3\cdot|x+2| = (*)$

$|2-x| = \begin{cases} 2-x & \text{si } 2-x \geq 0 \Rightarrow 2 \geq x \Rightarrow x \leq 2 \\ -2+x & \text{si } 2-x<0 \Rightarrow 2<x \Rightarrow x>2 \end{cases}$

$|x+2| = \begin{cases} x+2 & \text{si } x+2 \geq 0 \Rightarrow x \geq -2 \\ -x-2 & \text{si } x+2<0 \Rightarrow x<-2 \end{cases}$

$(*) = \begin{cases} x-(2-x)+3\cdot(-x-2) & \text{si } x<-2 \\ x-(2-x)+3\cdot(x+2) & \text{si } -2 \leq x \leq 2 \\ x-(-2+x)+3\cdot(x+2) & \text{si } x>2 \end{cases} =$

$= \boxed{\begin{cases} -x-8 & \text{si } x<-2 \\ 5x+4 & \text{si } -2 \leq x \leq 2 \\ 3x+8 & \text{si } x>2 \end{cases}}$

③ a) $\dfrac{\log(16-x^2)}{\log(3x-4)} = 2 \Rightarrow \log(16-x^2) = 2\cdot\log(3x-4) \Rightarrow$

$\Rightarrow \log(16-x^2) = \log(3x-4)^2 \Rightarrow 16-x^2 = (3x-4)^2 \Rightarrow \cancel{16}-x^2 = 9x^2-24x+\cancel{16}$

$\Rightarrow 0 = 10x^2 - 24x \Rightarrow x(10x-24) = 0 \Rightarrow \begin{cases} \underline{x=0} \\ 10x-24=0 \Rightarrow 10x = 24 \Rightarrow \end{cases}$

$\Rightarrow \underline{x} = \dfrac{24}{10} = \underline{\dfrac{12}{5}}$

Comprobación:

* Si $x = 0 \Rightarrow \underbrace{\dfrac{\log(16-0^2)}{\log(3\cdot 0-4)}}_{\nexists} = 2 \Rightarrow$ $\boxed{x=0 \text{ NO ES SOLUCIÓN}}$

* Si $x = \dfrac{12}{5} \Rightarrow \dfrac{\log\left(16-\frac{144}{25}\right)}{\log\left(3\cdot\frac{12}{5}-4\right)} = 2 \Rightarrow \dfrac{\log 10{,}24}{\log 3{,}2} = 2 \Rightarrow \underline{2=2} \Rightarrow$

$\Rightarrow$ $\boxed{x = \dfrac{12}{5} \text{ es SOLUCIÓN}}$

b) $4^x + 2^{2x-1} = 24 \Rightarrow (2^2)^x + \dfrac{2^{2x}}{2} = 24 \Rightarrow 2\cdot 2^{2x} + 2^{2x} = 48 \Rightarrow$

$\Rightarrow 3\cdot 2^{2x} = 48 \Rightarrow 2^{2x} = \dfrac{48}{3} \Rightarrow 2^{2x} = 16 \Rightarrow 2^{2x} = 2^4 \Rightarrow 2x = 4$

$\Rightarrow \boxed{x = 2}$

④ a) $(2x^3y - 3xy^3)^5 =$

$= \binom{5}{0}(2x^3y)^5 - \binom{5}{1}(2x^3y)^4\cdot(3xy^3) + \binom{5}{2}(2x^3y)^3\cdot(3xy^3)^2 - \binom{5}{3}(2x^3y)^2\cdot(3xy^3)^3 + \binom{5}{4}(2x^3y)\cdot(3xy^3)^4 -$

$- \binom{5}{5}(3xy^3)^5 =$

$= 1\cdot 2^5\cdot x^{15}y^5 - 5\cdot 2^4x^{12}y^4\cdot 3xy^3 + 10\cdot 2^3x^9y^3\cdot 3^2x^2y^6 - 10\cdot 2^2\cdot x^6y^2\cdot 3^3x^3y^9 + 5\cdot 2x^3y\cdot 3^4x^4y^{12} -$

$- 1\cdot 3^5x^5y^{15} =$

$= \boxed{32x^{15}y^5 - 240x^{13}y^7 + 720x^{11}y^9 - 1080x^9y^{11} + 810x^7y^{13} - 243x^5y^{15}}$

b) VER TEORÍA