

Problema 1 Resolver y discutir los siguientes sistemas:

$$\begin{cases} x- & y+ & z = 1 \\ 3x+ & y- & z = 2 \\ 2x+ & 2y- & 2z = 1 \end{cases} \quad \begin{cases} x+ & y+ & z = 4 \\ x- & y+ & z = 2 \\ 3x+ & y- & z = 1 \end{cases}$$

Solución:

$$\begin{cases} x- & y+ & z = 1 \\ 3x+ & y- & z = 2 \\ 2x+ & 2y- & 2z = 1 \end{cases} \implies \begin{cases} x = 3/4 \\ y = -1/4 + z \\ z = z \end{cases}$$

$$\begin{cases} x+ & y+ & z = 4 \\ x- & y+ & z = 2 \\ 3x+ & y- & z = 1 \end{cases} \implies \begin{cases} x = 3/4 \\ y = 1 \\ z = 9/4 \end{cases}$$

Problema 2 Resolver las ecuaciones:

1. $\sqrt{2x-1} = x-2$
2. $\log(1-x) - \log x = 2$
3. $2^{x-1} + 2^{x+1} - 1 = 0$

Solución:

1. $\sqrt{2x-1} = x-2 \implies x = 1, x = 5$
2. $\log(1-x) - \log x = 2 \implies x = \frac{1}{101}$
3. $2^{x-1} + 2^{x+1} - 1 = 0 \implies x = -1, 321928094$

Problema 3 Resolver los siguientes límites:

$$\lim_{x \rightarrow \infty} \frac{x^3 - 3x + 1}{2x^3 + 2}, \quad \lim_{x \rightarrow \infty} \left(\frac{2x-1}{2x} \right)^{x+1}$$

$$\lim_{x \rightarrow 1} \frac{x^3 + 2x - 3}{x^2 - 1}, \quad \lim_{x \rightarrow 1} \frac{\sqrt{2x-1} - 1}{x-1}$$

Solución:

$$\lim_{x \rightarrow \infty} \frac{x^3 - 3x + 1}{2x^3 + 2} = \frac{1}{2}, \quad \lim_{x \rightarrow \infty} \left(\frac{2x-1}{2x} \right)^{x+1} = e^{-1/2}$$

$$\lim_{x \rightarrow 1} \frac{x^3 + 2x - 3}{x^2 - 1} = \frac{5}{2}, \quad \lim_{x \rightarrow 1} \frac{\sqrt{2x-1} - 1}{x-1} = 1$$

Problema 4 Calcular las derivadas de las siguientes funciones:

$$y = (x + 1)^{10}, \quad y = \ln(x^2 + 1) \quad y = e^{x^2+2}$$

Solución:

$$y' = 10(x + 1)^9, \quad y' = \frac{2x}{x^2 + 1} \quad y' = 2xe^{x^2+2}$$