

**Examen de Matemáticas 4º de ESO**  
**Noviembre 2006**

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Resolver las siguientes ecuaciones y sistemas:

**Problema 1**

$$\log x - \log(1 - x) = 2$$

**Solución:**

$$\log\left(\frac{x}{1-x}\right) = \log 100 \implies 101x = 100 \implies x = \frac{100}{101}$$

**Problema 2**

$$2^x - 2^{x+1} + 1 = 0$$

**Solución:**

$$2^x - 2 \cdot 2^x + 1 = 0 \implies t - 2t + 1 = 0 \implies t = 1$$

$$t = 2^x = 1 \implies x = 0$$

**Problema 3**

$$\begin{cases} \log x + \log y = 3 \\ 2 \log x - \log y = 0 \end{cases}$$

**Solución:**

$$\begin{cases} \log x + \log y = 3 \\ 2 \log x - \log y = 0 \end{cases} \implies \begin{cases} u + v = 3 \\ 2u - v = 0 \end{cases} \implies$$

$$\begin{cases} u = \log x = 1 \implies x = 10 \\ v = \log y = 2 \implies y = 100 \end{cases}$$

**Problema 4**

$$\begin{cases} 2^x - 3^y = 1 \\ 2^x + 3^y = 3 \end{cases}$$

**Solución:**

$$\begin{cases} 2^x - 3^y = 1 \\ 2^x + 3^y = 3 \end{cases} \implies \begin{cases} u - v = 1 \\ u + v = 3 \end{cases} \implies$$

$$\begin{cases} u = 2 = 2^x \implies x = 1 \\ v = 1 = 3^y \implies y = 0 \end{cases}$$

**Problema 5**

$$\frac{x}{2} + \frac{x-1}{6} < 1 - \frac{x+1}{3}$$

**Solución:**

$$3x + x - 1 < 6 - 2x - 2 \implies x < \frac{5}{6} \implies \left(-\infty, \frac{5}{6}\right)$$

**Problema 6**

$$x^2 - x - 2 < 0$$

**Solución:**

$$x^2 - x - 2 = (x-2)(x+1) < 0$$

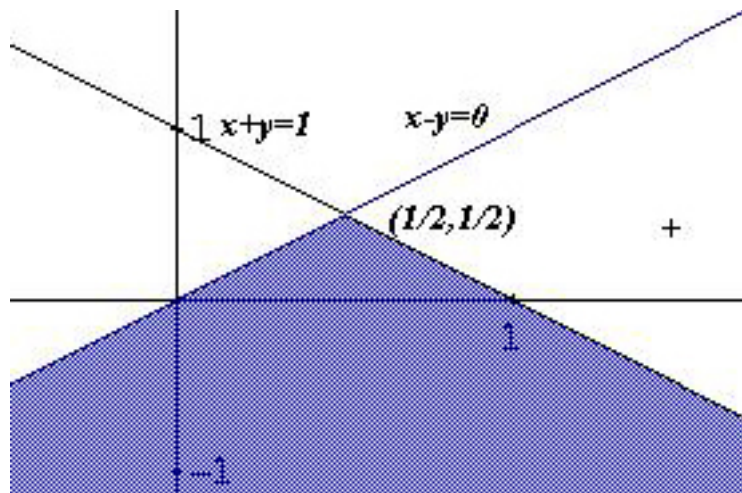
	$(-\infty, -1)$	$(-1, 2)$	$(2, \infty)$
$x+1$	-	+	+
$x-2$	-	-	+
$x^2-x-2$	+	-	+

La solución es:  $(-1, 2)$

**Problema 7**

$$\begin{cases} x+y < 1 \\ x-y > 0 \end{cases}$$

**Solución:**



$$x + y = 1 \implies \begin{array}{c|c} x & y \\ \hline 0 & 1 \\ 1 & 0 \end{array}$$

$$x - y = 0 \implies \begin{array}{c|c} x & y \\ \hline 0 & 0 \\ 1 & 1 \end{array}$$

$$\begin{cases} x + y = 1 \\ x - y = 0 \end{cases} \implies \begin{cases} x = 1/2 \\ y = 1/2 \end{cases} \implies (1/2, 1/2)$$

**Problema 8**

$$\sqrt{2x-1} + x = 8$$

**Solución:**

$$2x - 1 = 64 + x^2 - 16x \implies x^2 - 18x + 65 = 0 \implies$$

$$\begin{cases} x = 5 \\ x = 13 \text{ No Vale} \end{cases}$$

**Problema 9**

$$\sqrt{x+1} = x - 1$$

**Solución:**

$$x + 1 = 1 + x^2 - 2x \implies x^2 - 3x = 0 \implies x(x - 3) = 0$$

$$\begin{cases} x = 3 \\ x = 0 \text{ No Vale} \end{cases}$$

**Problema 10**

$$x^4 - 2x^2 - 8 = 0$$

**Solución:**

Hacemos  $z = x^2 \implies z^2 - 2z - 8 = 0 \implies z = 4 \text{ y } z = -2.$

$$z = 4 = x^2 \implies x = \pm 2$$

$$z = -2 = x^2 \text{ No Vale}$$