

$$\textcircled{1} a) \sqrt{7x+1} - 2\sqrt{x+4} = 0$$

$$\left(\sqrt{7x+1}\right)^2 = \left(2\sqrt{x+4}\right)^2$$

$$7x+1 = 4(x+4)$$

$$7x - 4x = 16 - 1$$

$$3x = 15$$

$$x = 5 \text{ Si, } \underline{\text{Solución}}$$

Comprobamos

$$\sqrt{7 \cdot 5 + 1} - 2\sqrt{5 + 4} = 0$$

$$6 - 2 \cdot 3 = 0$$

$$6 - 6 = 0$$

$$0 = 0 \quad \checkmark$$

$$b) \log(2x+3) - \log(x-1) = 2 \cdot \log 2 + 2 \log 3$$

$$\log \frac{2x+3}{x-1} = \log 4 \cdot 9$$

$$\frac{2x+3}{x-1} = 36 \Rightarrow 2x+3 = 36x-36$$

$$2x - 36x = -36 - 3$$

$$-34x = -39$$

$$x = \frac{39}{34}$$

Si es solución

$$\log\left(2 \cdot \frac{39}{34} + 3\right) - \log\left(\frac{39}{34} - 1\right) = 2 \cdot \log 2 + 2 \log 3$$

$$\log\left(\frac{180}{34}\right) - \log\left(\frac{5}{34}\right) = \log 4 \cdot 9 \Rightarrow \log \frac{180/34}{5/34} = \log 36$$

$$\log 36 = \log 36 \quad \checkmark$$

$$c) 9^x - 5 \cdot 3^x - 24 = 0$$

$$t = 3^x$$

$$3^{2x} - 5 \cdot 3^x - 24 = 0$$

$$t^2 - 5t - 24 = 0$$

$$t = \frac{5 \pm \sqrt{25 - 4 \cdot 1 \cdot (-24)}}{2 \cdot 1} = \frac{5 \pm 11}{2} = \begin{cases} t_1 = 8 \\ t_2 = -3 \rightarrow \text{No es solución} \end{cases}$$

$$t = 8$$

$$3^x \neq -3$$

$$3^x = 8$$

$$\log_3 3^x = \log_3 8$$

$$x \log_3 3 = \log_3 8$$

$$x = \log_3 8$$

$$\textcircled{2} a \begin{cases} x + y = 0 \Rightarrow x = -y \\ x \cdot y = 1 \Rightarrow -y^2 = 1 \Rightarrow y^2 = -1 \\ y = \pm \sqrt{-1} \Rightarrow y = \pm i \end{cases}$$

$$\begin{cases} \text{si } y_1 = i \Rightarrow x_1 = -i \\ \text{si } y_2 = -i \Rightarrow x_2 = i \end{cases}$$

②

$$b) \begin{cases} 2^x + 5^y = 9 \\ 2^{x+2} + 5^{y+1} = 41 \end{cases} \Rightarrow 2^x + 5^y = 9 \Rightarrow$$

$$\Rightarrow 2^2 \cdot 2^x + 5 \cdot 5^y = 41 \Rightarrow$$

$$2^x = t \quad 5^y = z \Rightarrow t + z = 9 \Rightarrow t = 9 - z \Rightarrow \boxed{t = 4}$$

$$4t + 5z = 41$$

$$4(9 - z) + 5z = 41$$

$$36 - 4z + 5z = 41$$

$$\boxed{z = 5}$$

$$5^y = z$$

$$5^y = 5$$

$$\boxed{y = 1}$$

$$t = 4$$

$$2^x = 2^2$$

$$\boxed{x = 2}$$

Solucion

$$y = 1$$

$$x = 2$$

$$c) \begin{cases} x \cdot y = -3 \Rightarrow x = \frac{-3}{y} \\ x^2 + 2y^2 = 19 \end{cases}$$

$$\left(\frac{-3}{y}\right)^2 + 2y^2 = 19$$

$$\frac{9}{y^2} + 2y^2 = 19$$

$$9 + 2y^4 - 19y^2 = 0$$

$$2y^4 - 19y^2 + 9 = 0$$

$$y^2 = t$$

$$2t^2 - 19t + 9 = 0$$

$$t = \frac{+19 \pm \sqrt{361 - 72}}{2 \cdot 2} = \begin{cases} \frac{19 + 17}{4} = 9 \\ \frac{19 - 17}{4} = \frac{1}{2} \end{cases}$$

$$y^2 = 9$$

$$y = \pm 3$$

$$y^2 = \frac{1}{2}$$

$$y = \pm \sqrt{\frac{1}{2}}$$

$$y = \pm \frac{\sqrt{2}}{2}$$

Para $y_1 = 3 \Rightarrow x_1 = -1$

$$y_2 = -3 \Rightarrow x_2 = 1$$

$$y_3 = \frac{+\sqrt{2}}{2} \Rightarrow x_3 = \frac{-3}{\sqrt{2}/2} = \frac{-6}{\sqrt{2}} = \frac{-6\sqrt{2}}{2} = -3\sqrt{2}$$

$$y_4 = \frac{-\sqrt{2}}{2} \Rightarrow x_4 = 3\sqrt{2}$$

$$d) \begin{cases} \log x + 3 \log y = 5 \Rightarrow \log x + 3 \log y = 5 \\ \log x - 2 \log y = 3 \Rightarrow -\log x + \log y = -3 \end{cases}$$

$$4 \log y = 2$$

$$\log y = \frac{1}{2}$$

$$10^{1/2} = y$$

$$y = \sqrt{10}$$

$$\log x + 3 \log 10^{1/2} = 5$$

$$\log x + \frac{3}{2} \log 10 = 5$$

$$\log x = 5 - \frac{3}{2}$$

$$\log x = \frac{7}{2}$$

$$x = 10^{7/2}$$

$$x = \sqrt{10^7}$$

$$x = 10^3 \sqrt{10}$$

$$\begin{array}{l} \text{Soluciones} \\ x = 10^3 \sqrt{10} \\ y = \sqrt{10} \end{array}$$

Comprobar:

$$\log 10^{7/2} + 3 \log 10^{1/2} = 5 \Rightarrow \frac{7}{2} \log 10 + \frac{3}{2} \log 10 = 5$$

$$\frac{10}{2} = 5$$

$$5 = 5$$

$$\log 10^{7/2} + \log 10^{1/2} = 3$$

$$\frac{7}{2} \log 10 + \frac{1}{2} \log 10 = 3 \Rightarrow \frac{8}{2} = 3$$

$$3 = 3 \quad \checkmark$$

$$a) \quad x + 2y - 2z = 4$$

$$2x + 5y - 2z = 10 \xrightarrow{2E_1 - E_2}$$

$$4x + 9y - 6z = 18 \xrightarrow{4E_1 - E_3}$$

$$x + 2y - 2z = 4$$

$$-y - 2z = -2$$

$$-y - 2z = -2$$

$$x + 2y - 2z = 4$$

$$-y - 2z = -2$$

$$0z = 0$$

$$\boxed{z = \lambda}$$

INFINITAS Soluciones
S. C. INDE.

$$-y - 2\lambda = -2$$

$$-y = -2 + 2\lambda$$

$$\boxed{y = 2 - 2\lambda}$$

$$x + 4 - 4\lambda - 2\lambda = 4$$

$$\boxed{x = 6\lambda}$$

$$\begin{cases}
 2x + y - z = 0 \\
 3x + 2y - 2z = 15 \\
 x + y - z = 7
 \end{cases}
 \begin{cases}
 x + y - z = 7 \\
 2x + y - z = 0 \xrightarrow{2E_1 - E_2} \\
 3x + 2y - 2z = 15 \xrightarrow{3E_1 - E_3}
 \end{cases}$$

$$\begin{cases}
 x + y - z = 7 \\
 y - z = 14 \\
 y - z = 6
 \end{cases}
 \begin{cases}
 x + y - z = 7 \\
 y - z = 14 \\
 \xrightarrow{E_3 - E_2} 0z = -8
 \end{cases}$$

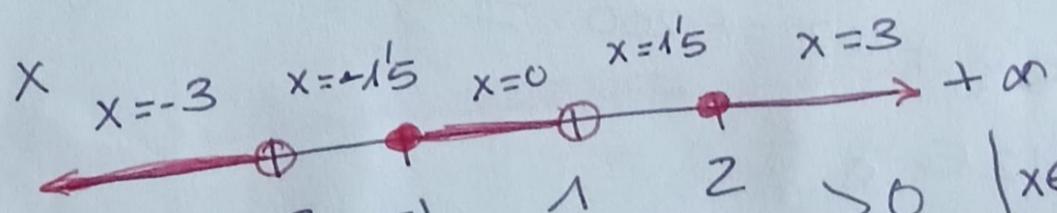
z no tiene solución

S. INCOMPATIBLE

③ $\frac{x^2 - x - 2}{x^2 + x - 2} \geq 0$

$$x^2 - x - 2 = 0; \quad x = \frac{1 \pm \sqrt{1+8}}{2} = \frac{1 \pm 3}{2} \begin{cases} x_1 = 2 \\ x_2 = -1 \end{cases}$$

$$x^2 + x - 2 = 0; \quad x = \frac{-1 \pm \sqrt{1+8}}{2} = \frac{-1 \pm 3}{2} = \begin{cases} x_1 = 1 \\ x_2 = -2 \end{cases}$$



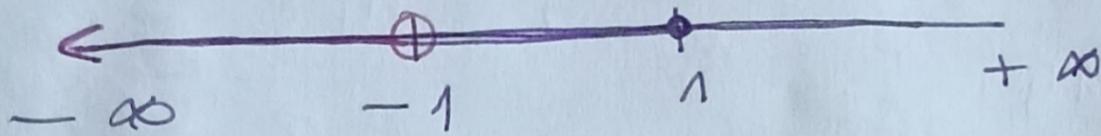
Solución

	$-\infty$	-2	-1	1	2	3	$+\infty$
NUMERADOR	> 0	> 0	< 0	< 0	> 0	> 0	
DENOMINADOR	> 0	< 0	< 0	> 0	> 0		
COCIENTE	> 0	< 0	> 0	< 0	> 0	> 0	
	Si	NO	Si	NO	Si		

$$x \in (-\infty, -2) \cup [-1, 1) \cup [2, +\infty)$$

b) $3 - 4 > x \Rightarrow -1 > x \Rightarrow x < -1$

$x \geq 2x - 1 \Rightarrow -x \geq -1 \Rightarrow x \leq 1$



$x \in (-\infty, -1)$

④

	Nº ENTRADAS	€/ENTRADA	DINERO
PATIO	$x = 100$	30	$30x$
PRIMER SEGUNDO TIS	$y = 80$	25	$25y$
VISION REDUCIDA	$z = 20$	10	$10z$
TOTAL	200		5200

$x + y + z = 200 \Rightarrow$
 $30x + 25y + 10z = 5200 \Rightarrow 6x + 5y + 2z = 1040$
 $z = 0.25y$

$x + y + 0.25y = 200$

$x = 200 - 1.25y$

$6(200 - 1.25y) + 5y + 2 \cdot 0.25y = 1040$

$1200 - 7.5y + 5y + 0.5y = 1040$

$-2y = 1040 - 1200$

$y = 80$

$x = 100$
 $z = 20$

	Nº	€ / CAMARA	DINERO
CAMARA FOTO A	x	120	120x
CAMARA FOTO B	y	180	180y

$x \geq 3 \Rightarrow x = 3$

$4 \leq y \leq 12 \Rightarrow y = 4 ; y = 12$

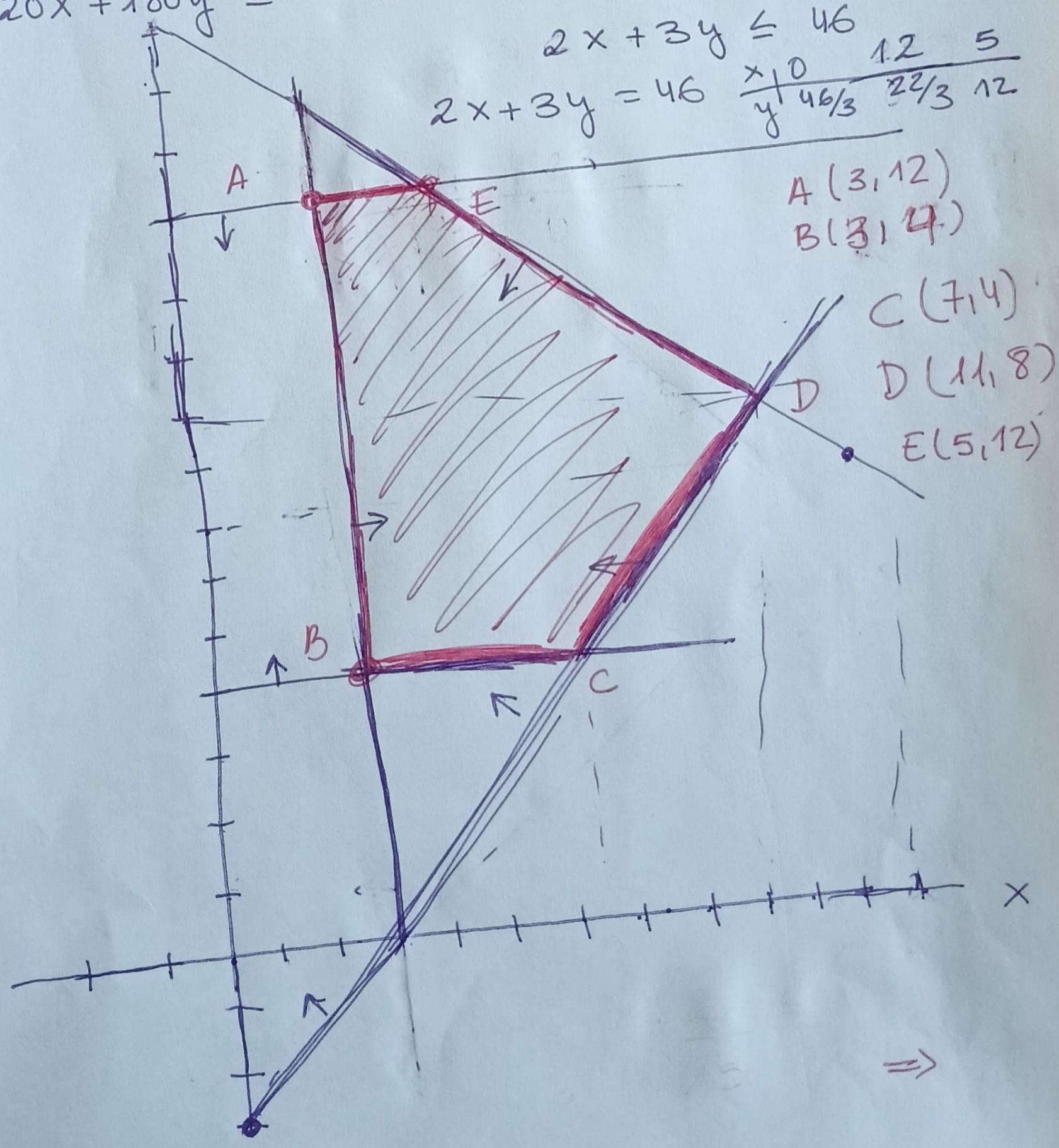
$x \leq y + 3 \Rightarrow x = y + 3$

$120x + 180y \leq 2760 \Rightarrow 6x + 9y \leq 138$

$2x + 3y \leq 46$

$2x + 3y = 46$

x	0	12	5
y	46/3	22/3	12



\Rightarrow

Para Calcular D:

$$x = y + 3$$

$$2x + 3y = 46 \Rightarrow 2y + 6 + 3y = 46$$

$$5y = 40$$

$$\boxed{y = 8}$$

$$\boxed{x = 11}$$