

TEMA 4. A.B

① $x+y+5z=0$
 (1,5) $2x+4y-10z=-7$
 $-2x+4y+30z=-1$

$$\left\{ \begin{array}{l} x+y+5z=0 \\ 2x+4y-10z=-7 \\ -2x+4y+30z=-1 \end{array} \right. \rightarrow \left(\begin{array}{ccc|c} 1 & 1 & 5 & 0 \\ 2 & 4 & -10 & -7 \\ -2 & 4 & 30 & -1 \end{array} \right) \xrightarrow{\substack{2F_1-F_2 \\ 2F_1+F_3}} \left(\begin{array}{ccc|c} 1 & 1 & 5 & 0 \\ 0 & -2 & 20 & 7 \\ 0 & 6 & 40 & -1 \end{array} \right) \xrightarrow{3F_2+F_3}$$

$$\left(\begin{array}{ccc|c} 1 & 1 & 5 & 0 \\ 0 & -2 & 20 & 7 \\ 0 & 0 & 100 & 20 \end{array} \right) \text{ SCD } 100z=20 \rightarrow z=\frac{20}{100}=\frac{1}{5} \rightarrow \boxed{z=\frac{1}{5}}$$

$$-2y+20z=7 \rightarrow -2y+20\cdot\frac{1}{5}=7 \rightarrow -2y+4=7 \rightarrow \boxed{y=-\frac{3}{2}}$$

$$x+y+5z=0 \rightarrow x+(-\frac{3}{2})+5(\frac{1}{5})=0 \rightarrow x-\frac{3}{2}+1=0 \rightarrow x=\frac{3}{2}-1=\frac{1}{2} \rightarrow \boxed{x=\frac{1}{2}}$$

Solución $(\frac{1}{2}, -\frac{3}{2}, \frac{1}{5})$

② $x-3y+2z=1$
 (1,5) $3x-2y+z=3$
 $-12x+y+z=-9$

$$\left\{ \begin{array}{l} x-3y+2z=1 \\ 3x-2y+z=3 \\ -12x+y+z=-9 \end{array} \right. \rightarrow \left(\begin{array}{ccc|c} 1 & -3 & 2 & 1 \\ 3 & -2 & 1 & 3 \\ -12 & 1 & 1 & -9 \end{array} \right) \xrightarrow{\substack{3F_1-F_2 \\ 12F_1+F_3}} \left(\begin{array}{ccc|c} 1 & -3 & 2 & 1 \\ 0 & -7 & 5 & 0 \\ 0 & -35 & 25 & -3 \end{array} \right) \xrightarrow{5F_2+F_3}$$

$$\left(\begin{array}{ccc|c} 1 & -3 & 2 & 1 \\ 0 & -7 & 5 & 0 \\ 0 & 0 & 0 & -3 \end{array} \right) \text{ SI } \neq \text{ Solución}$$

③ $x-3y+5z=2$
 1,5 $x+2y+z=1$
 $x-13y+13z=4$

$$\left\{ \begin{array}{l} x-3y+5z=2 \\ x+2y+z=1 \\ x-13y+13z=4 \end{array} \right. \rightarrow \left(\begin{array}{ccc|c} 1 & -3 & 5 & 2 \\ 1 & 2 & 1 & 1 \\ 1 & -13 & 13 & 4 \end{array} \right) \xrightarrow{\substack{F_1-F_2 \\ F_1-F_3}} \left(\begin{array}{ccc|c} 1 & -3 & 5 & 2 \\ 0 & -5 & 4 & 1 \\ 0 & -10 & 8 & -2 \end{array} \right) \xrightarrow{2F_2+F_3}$$

$$\left(\begin{array}{ccc|c} 1 & -3 & 5 & 2 \\ 0 & -5 & 4 & 1 \\ 0 & 0 & 0 & 0 \end{array} \right) \text{ SCI } \boxed{z=\lambda} \quad -5y+4z=1 \Rightarrow -5y+4\lambda=1 \rightarrow \boxed{y=\frac{1-4\lambda}{-5}}$$

$$x-3y+5z=2 \Rightarrow x-3\left(\frac{1-4\lambda}{-5}\right)+5\lambda=2$$

$$x=2-5\lambda+3\left(\frac{1-4\lambda}{-5}\right)=\frac{-10+25\lambda+3-12\lambda}{-5}$$

$$x=\frac{13\lambda-7}{-5}$$

Solución $(\frac{13\lambda-7}{-5}, \frac{1-4\lambda}{-5}, \lambda) \forall \lambda \in \mathbb{R}$

④ $\sqrt{x-1}+3=y$
 1,25 $xy=60$

$$(\sqrt{x-1}+3)^2=y^2 \rightarrow x-1=y^2-6y+9$$

$$x=y^2-6y+9+1=y^2-6y+10$$

$$xy=60 \rightarrow (y^2-6y+10)y=60 \rightarrow y^3-6y^2+10y-60=0$$

$$y=6 \rightarrow xy=60 \rightarrow x=\frac{60}{6}=10$$

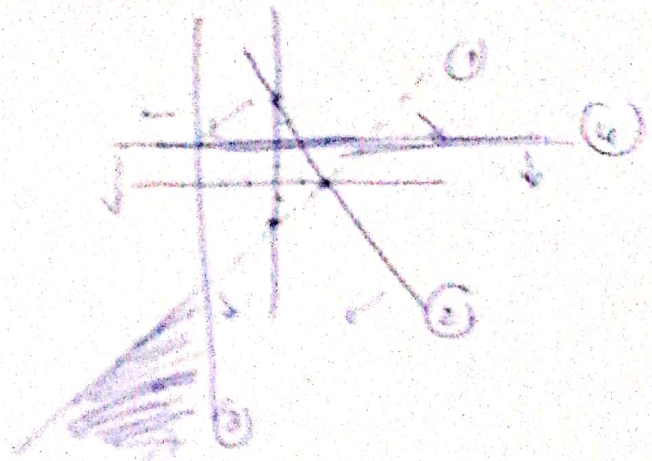
Solución (10,6)

$$\begin{array}{r|l} 6 & 1 \quad -6 \quad 10 \quad -60 \\ & 6 \quad 0 \quad 60 \\ \hline & 1 \quad 0 \quad 10 \quad 0 \\ & x^2+10=0 \end{array}$$

(1) $x+y=2$
 $2x+y=4$
 $x+3y=6$
 $y=2x-2$

(2) $x+y=2$
 $\frac{2x+y}{x+y} = \frac{4}{2}$

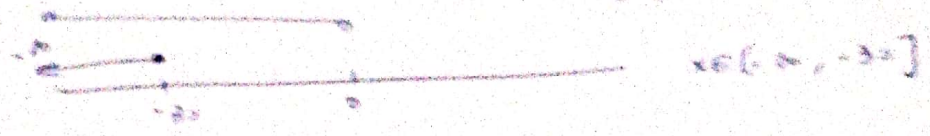
(3) $x=3 \rightarrow x+y=2$
 $y=2-3 = -1$



(6) $3 - (2x+3) \geq 0$
 $1 - \frac{2x}{3} \leq \frac{3}{3}$

$3 - 2x - 3 \geq 0 - 2$
 $-6x > 0$
 $x < 0$

$6 - 6x + 6 \geq \frac{2x-3x}{6}$
 $4x + 12 - 3x \geq 0$
 $x \geq -12$



(7) $-3x^2 - 3x + 6 > 0$
 $\frac{x^2 - 5x + 4}{x^2 - 2x - 3} > 0$

$-3x^2 - 3x + 6 > 0$
 $x = \frac{3 \pm \sqrt{9 - 4(-3)(6)}}{-6} = \frac{3 \pm 9}{-6}$
 $-3(x+2)(x-1) > 0$

$\frac{3}{-6} = -\frac{1}{2}$
 $\frac{-6}{-6} = 1$

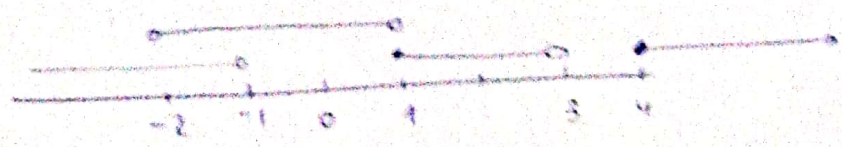
$x < -2$	-	+	+
$x = -1$	-	-	+
$x = 1$	-	-	-
$x > 2$	-	+	-

$x \in (-2, 1)$

$\frac{x^2 - 5x + 4}{x^2 - 2x - 3} = \frac{(x-1)(x-4)}{(x+1)(x-3)} > 0$

$x < -1$	-	-	+	+	+
$x = -1$	-	-	-	-	+
$x = 1$	-	+	+	+	+
$x = 3$	-	-	-	+	+
$x > 4$	+	-	+	-	+

$x \in (-1, 1) \cup (3, 4) \cup (4, +\infty)$



Solucão: $(-2, 1)$