1-

a) $\begin{cases} 2x - y = 2 \\ -x + 3y = -3 \end{cases}$

$\begin{vmatrix} 2 & -1 \\ -1 & 3 \end{vmatrix} \quad 6 - 1 = 5$ //

$D_x \begin{vmatrix} 2 & -1 \\ -3 & 3 \end{vmatrix} = 6 - 3 = 3$ //

$D_y \begin{vmatrix} 2 & 2 \\ -1 & -3 \end{vmatrix} = -6 - (-2) = -4$ //

$V = \left\{\left(\frac{3}{5}, -\frac{4}{5}\right)\right\}$ //

---

b) $\begin{cases} 3x - y + z = 1 \\ 2x + 3z = -1 \\ 4x + y - 2z = 7 \end{cases}$

$\begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & 3 \\ 4 & 1 & -2 \end{vmatrix} \quad -10 - 13 \quad -23$ //

$D_x \begin{vmatrix} 1 & -1 & 1 \\ -1 & 0 & 3 \\ 7 & 1 & -2 \end{vmatrix} \quad -22 - (-2 + 3) \quad -23$

$V = (1, 1, -1)$ //

$D_y \begin{vmatrix} 3 & 1 & 1 \\ 2 & -1 & 3 \\ 4 & 7 & -2 \end{vmatrix} \quad 32 - (-4 - 4 + 63) \quad -23$

$D_z \begin{vmatrix} 3 & -1 & 1 \\ 2 & 0 & -1 \\ 4 & 1 & 7 \end{vmatrix} \quad 6 - (-14 - 3) \quad 23$

2. $\begin{cases} 3x + 4y - z = 1 \\ 4x + 5y + 2z = 12 \\ x - 2y + 3z = 8 \end{cases}$

$D = \begin{vmatrix} 3 & 4 & -1 \\ 4 & 5 & 2 \\ 1 & -2 & 3 \end{vmatrix}$ | $61 \cdot (-5 \cdot 12 + 48$

$30_{//}$

$D_x = \begin{vmatrix} 1 & 4 & -1 \\ 12 & 5 & 2 \\ 8 & -2 & 3 \end{vmatrix}$ | $D_y = \begin{vmatrix} 3 & 1 & -1 \\ 4 & 12 & 2 \\ 1 & 8 & 3 \end{vmatrix}$

$\frac{D_y}{D} = \frac{30}{30} = 1_{//}$

$103 - 100$ | $78 - 48$

$3_{//}$ | $30_{//}$

LETRA (A)

3-

$$\begin{cases} x + 2y + z = 1 \\ 3x + y - 11z = -2 \\ 2x + 3y - z = 1 \end{cases}$$

$$D = \begin{vmatrix} 1 & 2 & 1 \\ 3 & 1 & -11 \\ 2 & 3 & -1 \end{vmatrix} \quad -36 - 37 = 1 //$$

$$D_x = \begin{vmatrix} 1 & 2 & 1 \\ -2 & 1 & -11 \\ 1 & 3 & -1 \end{vmatrix} \quad -29 + 28 \quad -1 //$$

$$D_y = \begin{vmatrix} 1 & 1 & 1 \\ 3 & -2 & -11 \\ 2 & 1 & -1 \end{vmatrix} \quad -17 + 18 \quad 1 //$$

$$D_z = \begin{vmatrix} 1 & 2 & 1 \\ 3 & 1 & -2 \\ 2 & 3 & 1 \end{vmatrix} \quad 2 - 2 \quad 0 //$$

$$x = \frac{-1}{1} \quad y = \frac{1}{1} \quad z = 0$$

$$-1 + 1 + 0 = 0$$

LETRA (C) //

4 -

$$\begin{cases} x + 2y - 3z = 29 \\ x + 3y + 2z = 4 \\ x - y - 2z = 8 \end{cases}$$

$$D = \begin{vmatrix} 1 & 2 & -3 \\ 1 & 3 & 2 \\ 1 & -1 & -2 \end{vmatrix} \quad 1 + 15 = 16 //$$

$$D_y = \begin{vmatrix} 1 & 29 & -3 \\ 1 & 4 & 2 \\ 1 & 8 & -2 \end{vmatrix}$$

$$26 + 54$$

$$80 //$$

$$D_z = \begin{vmatrix} 1 & 2 & 29 \\ 1 & 3 & 4 \\ 1 & -1 & 8 \end{vmatrix}$$

$$3 - 99$$

$$-96 //$$

$$y = \frac{80}{16} = 5 \qquad z = -96/16 = -6 //$$

$$x + y + z$$

$$1 + 5 - 6 \qquad \text{LETRA (A)} //$$

$$0 //$$

5. $\begin{cases} 2x+y=5 \\ 2y+z=3 \\ 3x+2y+z=7 \end{cases}$

$D: \begin{vmatrix} 2 & 1 & 0 \\ 0 & 2 & 1 \\ 3 & 2 & 1 \end{vmatrix}$ $7-4=3$ //

$Dx \begin{vmatrix} 5 & 1 & 0 \\ 3 & 2 & 1 \\ 7 & 2 & 1 \end{vmatrix}$ $17-13$ 4 //

$Dy \begin{vmatrix} 2 & 5 & 0 \\ 0 & 3 & 1 \\ 3 & 7 & 1 \end{vmatrix}$ $21-14$ 7 //

$D_2 \begin{vmatrix} 2 & 1 & 5 \\ 0 & 2 & 3 \\ 3 & 2 & 7 \end{vmatrix}$ $37-42$ -5 //

LETRA (D) //

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6- $\begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ -1 & 2 & 2 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 3 \\ 7 \\ -1 \end{bmatrix}$

$D \begin{vmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ -1 & 2 & 2 \end{vmatrix}$ $2_{//}$

$Dx \begin{vmatrix} 3 & 0 & 0 \\ 7 & 1 & 0 \\ -1 & 2 & 2 \end{vmatrix}$ $6_{//}$

$Dy \begin{vmatrix} 1 & 3 & 0 \\ 2 & 7 & 0 \\ -1 & 1 & 2 \end{vmatrix}$ $14-12$ $2_{//}$

$Dz \begin{vmatrix} 1 & 0 & 3 \\ 2 & 1 & 7 \\ -1 & 2 & -1 \end{vmatrix}$ $0_{//}$

$x = \frac{6}{2} = 3 \quad \left\{ y = \frac{2}{2} = 1 \right\} z = 0$ LETRA (E)

1-

$$S = \begin{cases} 2x - y - 3z = -5 \\ x + 3y - z = 11 \\ x - 5z = 3 \end{cases}$$

$$\begin{matrix} -0,5 \\ L \\ L \end{matrix} \begin{pmatrix} 2 & -1 & -3 & ; & -5 \\ 1 & 3 & -1 & ; & 11 \\ 1 & 0 & -5 & ; & 3 \end{pmatrix}$$

$$\Downarrow$$

$$\begin{matrix} 0,5x \\ -3,5x \end{pmatrix} \begin{pmatrix} 0 & 3,5 & 0,5 & ; & 3,5 \\ 0 & 0,5 & -3,5 & ; & 5,5 \end{pmatrix} \Rightarrow \begin{pmatrix} & & & & \\ 0 & 0 & 12,50 & ; & -12,50 \end{pmatrix}$$

$12,50z = -12,50$ $\quad z = -1$ //

$\begin{cases} x - 5z = 3 \\ x = -2 \text{ //} \end{cases}$

$\begin{cases} 2x - y - 3z = -5 \\ y = 4 \text{ //} \end{cases}$

2-

$$\begin{cases} x = 2y \\ 2y = 3z \\ x + y + z = 11 \end{cases} \Rightarrow 2y = 3z \Rightarrow z = \frac{2y}{3}$$

$$\begin{cases} x + y + z = 11 \\ 2y + y + \frac{2y}{3} = 11 \end{cases} \Rightarrow \times 3$$

$3y + 3y + 2y = 33$

$11y = 33$

$y = 3$ //

$x = 6$ // $\quad y = 3$ // $\quad z = 2$ //

$x + 2y + 3z = 18$ //

LETRA (B) //

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3-

$$\begin{cases} x+y+z=0 \\ 2x-y-2z=1 \\ 6y+3z=-12 \end{cases}$$

$2y+z=-4 \quad \div 3$

$z=-2y-4$

$x+y+z=0$

$x+y-2y-4=0$

$x=y+4$

$2x-y-2z=1$

$2x-y-2(-2y-4)-2z=1$

$2x+3y=-7$

$2(y+4)+3y=-7$

$5y=-15$

$y=-3$ //

$x=-3+4$

$x=1$ //

$x+y+z=0$

$1-3+z=0$

$z=2$ //

4- $\begin{cases} a+b+c=68 \\ b+0,2c=a \\ c+0,2a=3b \end{cases}$

$\Downarrow$

$(b+0,2c)+b+c=68$

$2b+1,2c=68$

$2b+1,2c=68$

$b=34-0,6c$

$\Rightarrow$

$\begin{cases} c+0,2a=3b \\ c+0,2a=102-1,8c \\ 2,8c+0,2a=102 \\ 2,84c+0,2b=102 \end{cases}$

$c=35$ //

$a+b+c=68$

$a=20$ //

$\begin{cases} b=34-0,6c \\ b=13 \end{cases}$ //

LETRA (A)

5 - $\begin{cases} 3y + 4z = 134 \\ x + 5z = 115 \\ 2x + y = 48 \end{cases}$

$D = \begin{vmatrix} 0 & 3 & 4 \\ 1 & 0 & 5 \\ 2 & 1 & 0 \end{vmatrix}$ $34_{//}$

$D_x = \begin{vmatrix} 134 & 3 & 4 \\ 115 & 0 & 5 \\ 48 & 1 & 0 \end{vmatrix}$ $1180 - 670$ $510_{//}$

$D_y = \begin{vmatrix} 0 & 134 & 4 \\ 1 & 115 & 5 \\ 2 & 48 & 0 \end{vmatrix}$ $1532 - 920$ $612_{//}$

$D_z = \begin{vmatrix} 0 & 3 & 134 \\ 1 & 0 & 115 \\ 2 & 1 & 48 \end{vmatrix}$ $804 - 124$ $680_{//}$

$x = \frac{510}{34} = 15$ $\quad y = \frac{612}{34} = 18$ $\quad z = \frac{680}{34} = 20$ $\quad 15 + 18 + 20 = 53_{//}$

LETRA (A)