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1. $\begin{cases} ax + 4y = 1 \\ x + 2y = b \end{cases}$ $\begin{pmatrix} a & 4 \\ 1 & 2 \end{pmatrix} \rightarrow 2a - 4 \rightarrow 2a = 4 \rightarrow a = 2$

$2x + 4y = 1$

$2x = 1 - 4y$

$x = \frac{1-4y}{2}$

$x + 2y = b$

$\frac{1-4y}{2} + 2y = b$

$\frac{1-4y+4y}{2} = b$

$\frac{1}{2} = b$

$D = \begin{pmatrix} 2 & 4 \\ 1 & 2 \end{pmatrix} \rightarrow 4 - 4 = 0$

$D_x = \begin{pmatrix} 4 & 1 \\ 2 & \frac{1}{2} \end{pmatrix} \rightarrow 2 - 2 = 0$

$D_y = \begin{pmatrix} 2 & 1 \\ 1 & \frac{1}{2} \end{pmatrix} \rightarrow 1 - 1 = 0$

$x = \frac{D_x}{D} = \frac{0}{0} \qquad y = \frac{D_y}{D} = \frac{0}{0}$

Letra B.

2 $\begin{cases} x + Ky = 1 \\ Kx + y = 1 - K \end{cases}$

$$\begin{pmatrix} 1 & K & 1 \\ K & 1 & 1-K \end{pmatrix} \sim \begin{pmatrix} 1-K & K-1 & K \end{pmatrix}$$

$1 - k + k - 1 = k$

$0 = k$

indeterminada

várias soluções

Letra D.

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

a.

$$A = \begin{vmatrix} 1 & 2 & c \\ 0 & 1 & 1 \\ 3 & 2 & 2 \end{vmatrix} \begin{matrix} 1 & 2 \\ 0 & 1 \\ 3 & 2 \end{matrix}$$

$\rightarrow$ Det A $= 2 - 3c - 2 = 6 - 3c$

b. $6 - 3c = 0$

$-3c = -6$

$c = \frac{-6}{-3}$

$c = 2$

4. $\begin{cases} x - y = k \\ 12x - ky + z = 1 \\ 36x + kz = 2 \end{cases}$

$$A = \begin{pmatrix} 1 & -1 & 0 \\ 12 & -k & 1 \\ 36 & 0 & k \end{pmatrix} \begin{matrix} 1 & -1 \\ 12 & -k \\ 36 & 0 \end{matrix} \rightarrow \text{Det } A = -k^2 - 36 + 12k$$

$$-k^2 + 12k - 36 = 0$$

$a = -1$

$b = 12$

$c = -36$

$\Delta = b^2 - 4 \cdot a \cdot c$

$\Delta = 12^2 - 4 \cdot (-1) \cdot (-36)$

$\Delta = 144 - 144$

$\Delta = 0$

$$k = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{-12 \pm 0}{-2} = 6$$

Letra E.

5. $\begin{cases} x - y + z = 6 \\ 2x + y - z = -3 \\ x + 2y - z = -5 \end{cases}$

$$\begin{pmatrix} 1 & -1 & 1 & 6 \\ 2 & 1 & -1 & -3 \\ 1 & 2 & -1 & -5 \end{pmatrix} \sim \begin{pmatrix} 0 & 3 & -3 & -15 \\ 0 & 3 & -2 & -11 \end{pmatrix} \sim \begin{pmatrix} & & & \\ 0 & 0 & 1 & 4 \end{pmatrix}$$

$x + 2y - z = -5$

$x - 6 = -5$

$x = 1$

$3y - 2z = -11$

$3y - 8 = -11$

$3y = -3$

$y = -1$

$z = 4$

$x \cdot y \cdot z \rightarrow 1 \cdot (-1) \cdot 4 = -4$

Letra B.

6. $\begin{cases} x+y+z=k \\ kx+y+z=1 \\ x+y-z=k \end{cases}$

$1+1-k=2-k$

$\begin{pmatrix} 1 & 1 & 1 \\ k & 1 & 1 \\ 1 & 1 & -1 \end{pmatrix} \begin{matrix} 1 & 1 \\ k & 1 \\ 1 & 1 \end{matrix} \Rightarrow k-2+k=2k-2$

$2k-2=0$

$2k=2$

$k=\frac{2}{2}=1$

Letra D.

7. $\begin{cases} x+y+z=1 \\ mx-2y+4z=5 \\ m^2x+4y+16z=25 \end{cases}$

$-2m^2+16+16m$

$\begin{vmatrix} 1 & 1 & 1 \\ m & -2 & 4 \\ m^2 & 4 & 16 \end{vmatrix} \begin{matrix} 1 & 1 \\ m & -2 \\ m^2 & 4 \end{matrix} \rightarrow 4m^2+4m-32+2m^2-16-16m$

$\downarrow$

$-32+4m^2+4m \qquad 6m^2-12m-48$

$6m^2-12m-48=0$

$a=6$

$b=-12$

$c=-48$

$\Delta = b^2-4.a.c$

$\Delta = (-12)^2-4.6.(-48)$

$\Delta = 144+1152$

$\Delta = 1296$

$x = \frac{-b \pm \sqrt{\Delta}}{2a} = \frac{12 \pm 36}{12}$

$x' = \frac{12+36}{12} = \frac{48}{12} = 4$

$x'' = \frac{12-36}{12} = \frac{-24}{12} = -2$

$x' + x'' = 4-2 = 2$

Letra B.