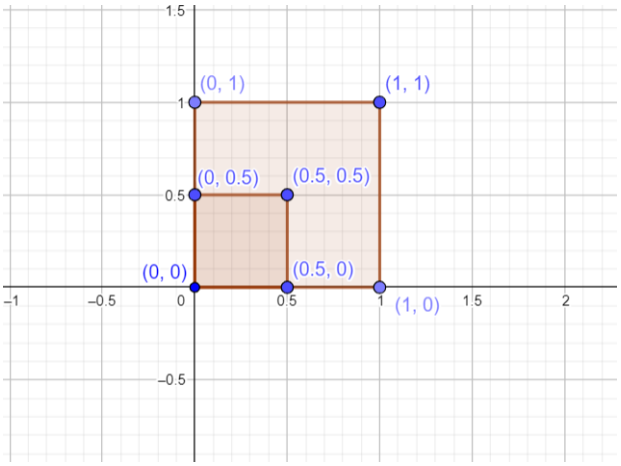
1. a. $A = \begin{bmatrix} 0 & 1 & 1 & 1 \\ 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 0 \\ 1 & 0 & 0 & 0 \end{bmatrix}$ b. Un camino: 2 - 1- 4

2.

3. a. $\begin{pmatrix} x' \\ y' \end{pmatrix} = \begin{pmatrix} 0{,}5 & 0 \\ 0 & 0{,}5 \end{pmatrix} \begin{pmatrix} 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{pmatrix} = \begin{pmatrix} 0 & 0{,}5 & 0 & 0{,}5 \\ 0 & 0 & 0{,}5 & 0{,}5 \end{pmatrix}$

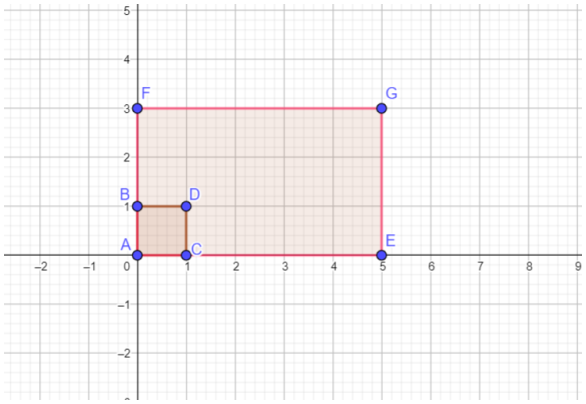
Gráficamente



b.

$$\begin{pmatrix} x' \\ y' \end{pmatrix} = \begin{pmatrix} 5 & 0 \\ 0 & 3 \end{pmatrix} \begin{pmatrix} 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{pmatrix} = \begin{pmatrix} 0 & 5 & 0 & 5 \\ 0 & 0 & 3 & 3 \end{pmatrix}$$

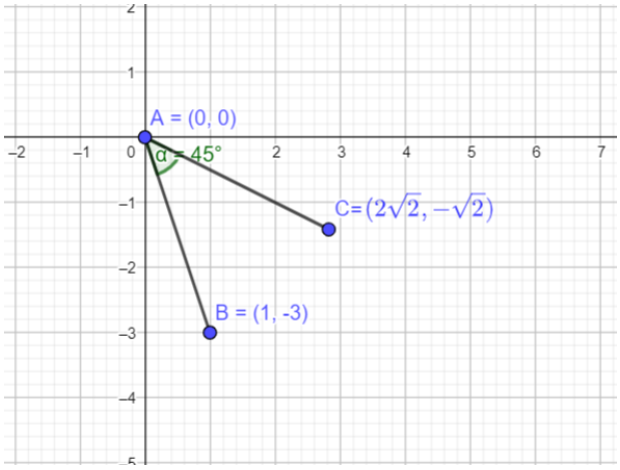
Gráficamente



4.

$$R(x\ y) = \begin{pmatrix} \frac{\sqrt{2}}{2} & -\frac{\sqrt{2}}{2} \\ \frac{\sqrt{2}}{2} & \frac{\sqrt{2}}{2} \end{pmatrix} \cdot \begin{pmatrix} 0 & 1 \\ 0 & -3 \end{pmatrix} = \begin{pmatrix} 0 & 2\sqrt{2} \\ 0 & -\sqrt{2} \end{pmatrix}$$

Gráficamente



5. a. El alimento 2 no contiene vitamina C. El alimento 1 no contiene vitamina D. El alimento 2 contiene igual cantidad de vitamina A y D.

b. A: 5,9 B: 6,5 C: 7,6 D: 2,7

c. alimento 1: 12,3 u.m. alimento 2: 11,5 u.m. alimento 3: 19,8 u.m.

6.

a. $\begin{pmatrix} 2 & 4 & 6 \\ 0 & -2 & 4 \end{pmatrix}$ b. No se puede realizar c. $\begin{pmatrix} 2 & 3 & 2 \\ 2 & -2 & 3 \end{pmatrix}$

d. $\begin{pmatrix} -2 & -6 \\ -1 & 2 \\ 6 & -1 \end{pmatrix}$ e. $\begin{pmatrix} 0 & 3 \\ -3 & 3 \end{pmatrix}$ tr(AB) = 3 f. $\begin{pmatrix} 1 & 0 & 7 \\ 1 & 3 & 1 \\ -1 & -3 & -1 \end{pmatrix}$ tr(BA) = 3

7. $x = \frac{-1}{3}, y = -2$

8. a. 1 b. 6 c. -8 d. -1

9. $k = 0, k = 2, k = -2, k = 3$

10.

a) det(A) = 2, det(B^T) = 6, det(AB) = 12, det(2A) = 16, det(A^{10}) = 2^{10}, det($A^5B - A^5$) = 2^8

b) 360

11.

a. No es inversible

b. i. Es inversible ii. $B^{-1} = \begin{pmatrix} \frac{1}{3} & \frac{2}{3} \\ \frac{-1}{3} & \frac{1}{3} \end{pmatrix}$

c. i. Es inversible ii. $C^{-1} = \begin{pmatrix} 1 & 0 & 0 \\ -13 & 1 & -5 \\ 2 & 0 & 1 \end{pmatrix}$

d. i. Es inversible ii. $D^{-1} = \begin{pmatrix} \frac{1}{4} & -\frac{3}{4} & -\frac{5}{28} \\ 0 & 1 & \frac{1}{7} \\ 0 & 0 & \frac{1}{7} \end{pmatrix}$

12. i.

$X = A^{-1}B = \begin{pmatrix} -\frac{1}{2} & 3 & 0 \\ \frac{3}{2} & -9 & 2 \\ -1 & 9 & -2 \end{pmatrix}$ ii. $X = (4A + 2B)A^{-1} = \begin{pmatrix} 0 & -4 & 16 \\ 6 & 12 & 24 \\ 6 & 9 & -23 \end{pmatrix}$