Aplicações Lineares

Álgebra Linear e Geometria Analítica - ALGA A **Soluções da Folha Prática 7**

---

1. (a) Não; (b) Sim; (c) Não; (d) Sim; (e) Não.

2. Não.

3. Sim.

4. (a) $(1,-19)$; (b) $(a+b,-5a+2b)$.

5. (a) $3+2t-5t^2+2t^3$; (b) $c+at+bt^2+at^3$.

6. i. $\begin{bmatrix} 1 & 2 & 1 \\ 2 & -1 & 0 \\ 0 & 2 & 1 \end{bmatrix}$; ii. $\begin{bmatrix} 1 & 2 & 1 \\ 2 & -1 & 0 \\ -3 & 1 & 0 \end{bmatrix}$; iii. $\begin{bmatrix} 2 & 3 & 1 \\ 2 & -1 & 0 \\ 1 & 3 & 1 \end{bmatrix}$; iv. $\begin{bmatrix} 2 & 3 & 1 \\ 2 & -1 & 0 \\ -3 & 1 & 0 \end{bmatrix}$.

7. (a) $\begin{bmatrix} 1 & 1 \\ 1 & -1 \\ 1 & 2 \end{bmatrix}$. (b) $\begin{bmatrix} 1 & -1/3 \\ 0 & 2/3 \\ -1 & 4/3 \end{bmatrix}$. (c) $\begin{bmatrix} -1 \\ 5 \\ -4 \end{bmatrix}$.

8. (a) $\begin{bmatrix} 1 & 0 & 2 \\ 2 & 1 & 0 \\ -2 & 0 & -1 \end{bmatrix}$. (b) $4t^2-4t+1$.

9. (b) i. $\begin{bmatrix} 1 & 0 & 2 & 0 \\ 0 & 1 & 0 & 2 \\ 2 & 0 & 3 & 0 \\ 0 & 2 & 0 & 3 \end{bmatrix}$; ii. $\begin{bmatrix} 3 & -2 & 5 & -3 \\ 0 & 1 & 0 & 2 \\ 2 & 0 & 3 & 0 \\ -2 & 2 & -3 & 3 \end{bmatrix}$; iii. $\begin{bmatrix} 1 & 0 & 2 & 1 \\ 0 & 1 & 2 & 2 \\ 2 & 0 & 3 & 2 \\ 0 & 2 & 3 & 3 \end{bmatrix}$; iv. $\begin{bmatrix} 3 & -2 & 2 & 0 \\ 0 & 1 & 2 & 2 \\ 2 & 0 & 3 & 2 \\ -2 & 2 & 0 & 1 \end{bmatrix}$.

10. (a) $[L(X_1)]_{\mathcal{T}} = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$, $[L(X_2)]_{\mathcal{T}} = \begin{bmatrix} 0 \\ 1 \\ -2 \end{bmatrix}$.
    (b) $L(X_1) = t^2+t+2$, $L(X_2) = -t+2$.
    (c) $3/2t^2+t+4$;
    (d) $\left(\frac{a+b}{2}\right)t^2+bt+2a$.

11. (a) $\begin{bmatrix} 1 & 0 & 2 & 0 \\ 0 & 0 & 0 & 6 \\ 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$; (b) $\begin{bmatrix} 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \\ 6 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \end{bmatrix}$.

13. (b) i. $\begin{bmatrix} 3 & 4 & 4 & 3 \\ 4 & 3 & 2 & 0 \end{bmatrix}$; ii. $\frac{1}{2}\begin{bmatrix} 7 & 7 & 6 & 3 \\ -1 & 1 & 2 & 3 \end{bmatrix}$.

14. (a) $L(1,2,3) = (9,7,16)$ e $L(x,y,z) = (x+y+2z, 2x+y+z, 3x+2y+3z)$.
    (b) $\begin{bmatrix} -2 & -4 & -1 \\ 5 & 8 & 3 \\ -1 & 0 & -1 \end{bmatrix}$.

15. (a) $\begin{bmatrix} -1 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}$.
    (b) $[L(X)]_{B_c} = \begin{bmatrix} 1 \\ 9 \end{bmatrix}$. $L(X) = \begin{bmatrix} 1 \\ 9 \end{bmatrix}$.

(c) $\begin{bmatrix} 0 & 1 & -2 \\ 2 & -1 & 0 \end{bmatrix}$.

(d) $L(x, y, z) = (y - 2z, 2x - y)$.

16. (a) $L(x, y) = (2x + y, 0, 2x)$.

(b) $\begin{bmatrix} 0 & 0 \\ 3 & 1 \\ -1 & 1 \end{bmatrix}$.

(c) $\begin{bmatrix} 1/2 \\ -1/2 \end{bmatrix}$.

17. (a) $L(x, y, z) = (x + 2y + z, 3y + z, x - y)$.

(b) $\begin{bmatrix} 6 & 3 & 1 \\ -5 & -2 & -1 \\ -2 & -2 & 0 \end{bmatrix}$.