9. $T: \mathbb{R}^3 \to \mathbb{R}^3; T\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -x + 2y + z \\ 2x - 4y - 2z \\ -3x + 6y + 3z \end{pmatrix}$

10. $T: \mathbb{R}^4 \to \mathbb{R}^2; T\begin{pmatrix} x \\ y \\ z \\ w \end{pmatrix} = \begin{pmatrix} x + z \\ 5w - 4y \end{pmatrix}$

11. $T: \mathbb{R}^3 \to \mathbb{R}^4; T\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} z \\ x - z \\ y - z \\ y \end{pmatrix}$

12. $T: \mathbb{R}^4 \to \mathbb{R}^2; T\begin{pmatrix} x \\ y \\ z \\ w \end{pmatrix} = \begin{pmatrix} aw + bx \\ cy + dz \end{pmatrix}$

13. $T: \mathbb{R}^2 \to \mathbb{R}^2; T\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 3x + 2y \\ -5x - 4y \end{pmatrix}; B_1 = B_2 = \left\{ \begin{pmatrix} 3 \\ -2 \end{pmatrix}, \begin{pmatrix} -1 \\ 1 \end{pmatrix} \right\}$

14. $T: \mathbb{R}^2 \to \mathbb{R}^3; T\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2y \\ 2y - x \\ 4x \end{pmatrix}; B_1 = \left\{ \begin{pmatrix} 3 \\ 2 \end{pmatrix}, \begin{pmatrix} 2 \\ 1 \end{pmatrix} \right\}; B_2 = \left\{ \begin{pmatrix} 1 \\ 0 \\ -1 \end{pmatrix}, \begin{pmatrix} 1 \\ -1 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ -1 \end{pmatrix} \right\}$

15. $T: \mathbb{R}^3 \to \mathbb{R}^2; T\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 2x + y + z \\ y - 3z \end{pmatrix}; B_1 = \left\{ \begin{pmatrix} 1 \\ 0 \\ 1 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 \\ 1 \\ 1 \end{pmatrix} \right\}; B_2 = \left\{ \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \begin{pmatrix} 2 \\ 3 \end{pmatrix} \right\}$

16. $T: \mathbb{R}^2 \to \mathbb{R}^4; T\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 2x + 3y \\ -5x - 4y \\ -6x - 9y \\ x + y \end{pmatrix}; B_1 = \left\{ \begin{pmatrix} 3 \\ -2 \end{pmatrix}, \begin{pmatrix} -1 \\ 1 \end{pmatrix} \right\}; B_2 = \left\{ \begin{pmatrix} 1 \\ 1 \\ 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 1 \\ 1 \\ 0 \end{pmatrix}, \begin{pmatrix} 0 \\ 0 \\ 1 \\ 1 \end{pmatrix}, \begin{pmatrix} 0 \\ 0 \\ 0 \\ 1 \end{pmatrix} \right\}$

17. $T: \mathbb{P}_2 \to \mathbb{P}_2; T(a_0 + a_1 x + a_2 x^2) = a_0 + (a_1 + a_2)x + a_1 x^2$

18. $T: \mathbb{R}^2 \to \mathbb{P}_2; T\begin{pmatrix} a \\ b \end{pmatrix} = a + bx + (a - b)x^2$

19. $T: \mathbb{P}_2 \to \mathbb{R}^2; T(a_0 + a_1 x + a_2 x^2) = \begin{pmatrix} a_0 + a_1 \\ a_0 + a_1 + 2a_2 \end{pmatrix}$

20. $T: \mathbb{M}_{22} \to \mathbb{P}_2; T\begin{pmatrix} a & b \\ c & d \end{pmatrix} = a + b + (b - 2c)x + (a - d)x^2; T(a_0 + a_1 x + a_2 x^2 + a_3 x^3) = (a_1 + a_3)$
$x - a_2$

21. $T: \mathbb{P}_4 \to \mathbb{P}_4; P(a_0 + a_1 x + a_2 x^2 + a_3 x^3 + a_4 x^4) = a_4 x^4 + a_2 x^2 + a_0$

22. $T: \mathbb{P}_3 \to \mathbb{M}_{22}; T(a_0 + a_1 x + a_2 x^2 + a_3 x^3) = \begin{pmatrix} a_0 & -a_1 \\ 2a_2 & -a_3 \end{pmatrix}$

23. $T: \mathbb{M}_{22} \to \mathbb{M}_{22}; T\begin{pmatrix} a & b \\ c & d \end{pmatrix} = \begin{pmatrix} a - b + 2c + d & -a & b + 2c + 2d \\ a - 2b + 5c + 4d & 2a - b + c - d \end{pmatrix}$

24. $T: \mathbb{P}_4 \to \mathbb{P}_3; P(a_0 + a_1 x + a_2 x^2 + a_3 x^3 + a_4 x^4) = a_3 x^3 + a_1 x$

25. $T: \mathbb{M}_{23} \to \mathbb{R}^3; T\begin{pmatrix} a & b & c \\ d & e & f \end{pmatrix} = \begin{pmatrix} a + e \\ b + f \\ c + d \end{pmatrix}$

26. $T: \mathbb{P}_2 \to \mathbb{P}_3; T[p(x)] = xp(x); B_1 = \{1, x, x^2\}; B_2 = \{1, (1 + x), (1 + x)^2, (1 + x)^3\}$

27. $T: \mathbb{P}_2 \to \mathbb{P}_3; Tp(x) = xp(x) + p(x); B_1 = \{1, x, x^2\}; B_2 = \{1, (x - 1),$
$(x - 1)(x - 2), (x - 1)(x - 2)(x - 3)\}$

∫ **Cálculo**