

3. $\begin{bmatrix} 4 & -52 \\ -52 & 676 \end{bmatrix}$.

5. $\frac{1}{320} \begin{bmatrix} 17 & 8 \\ 6 & -16 \end{bmatrix}$.

7. (a) $\begin{bmatrix} -5 + 3a & 2a + 4b \\ -14 + 7a & 5a + 9b \end{bmatrix}; a = 2, b = -1$.

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

13. $\begin{bmatrix} -3e^{-3t} & -2 \sec^2 t \tan t \\ 6t^2 & -\sin t \\ 6/t & -5 \end{bmatrix}$.

15. Not possible.

17. $(-\frac{17}{2}, \frac{1}{2}, 0)$.

19. $\{(5 - t, t - 2, t) : t \in \mathbb{R}\}$.

21. $\{(-\frac{2}{7}, -\frac{2}{7}, -\frac{41}{7}, -2, 0) + t(\frac{16}{7}, -\frac{33}{7}, -\frac{15}{7}, -4, 1) : t \in \mathbb{R}\}$.

23. $\{(0, -\frac{1}{3}, 0) + t(\frac{1}{2}(1 - 3i), \frac{1}{6}(1 + i), 1) : t \in \mathbb{R}\}$.

25. Infinitely many solutions for all k .

27. (a) $k = 2$.

(b) $k \neq 0, 2$.

(c) $k = 0$.

29. (a) $\begin{bmatrix} 1 & \frac{7}{4} \\ 0 & 1 \end{bmatrix}$.

(b) $\text{rank}(A) = 2$.

(c) $\begin{bmatrix} \frac{5}{34} & -\frac{7}{34} \\ \frac{1}{17} & \frac{2}{17} \end{bmatrix}$.

31. (a) $\begin{bmatrix} 1 & -\frac{1}{3} & 2 \\ 0 & 1 & \frac{3}{2} \\ 0 & 0 & 0 \end{bmatrix}$.

(b) $\text{rank}(A) = 2$.

(c) No inverse.

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

(b) $\text{rank}(A) = 3$.

(c) $\begin{bmatrix} \frac{1}{3} & 0 & 0 \\ -\frac{1}{9} & \frac{2}{3} & \frac{1}{3} \\ -\frac{2}{9} & \frac{1}{3} & \frac{2}{3} \end{bmatrix}$.

35. For $\mathbf{e}_1: (25, 3, -7)$. For $\mathbf{e}_2: (-7, -1, 2)$. For $\mathbf{e}_3: (4, 1, -1)$.

39. (a) $A = M_1(4)A_{12}(-2)M_2(17/2)A_{21}(7/4)$.

(b) $L = \begin{bmatrix} 1 & 0 \\ -\frac{1}{2} & 1 \end{bmatrix}; U = \begin{bmatrix} 4 & 7 \\ 0 & \frac{17}{2} \end{bmatrix}$.

41. (a) $A = M_1(3)A_{13}(1)P_{23}A_{23}(-2)M_3(3)A_{32}(2)M_2(-1)$.

(b) $L = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ \frac{1}{3} & -\frac{1}{2} & 1 \end{bmatrix}; U = \begin{bmatrix} 3 & 0 & 0 \\ 0 & 2 & -1 \\ 0 & 0 & \frac{3}{2} \end{bmatrix}$.

43. (b) All terms containing two factors of A and one factor of B become subtracted.

(c) 2^k .

45. (a) 6.

(b) 4.