

**Section 1.1, exercise 11)** For which value(s) of the constant  $k$  does the system

$$\begin{aligned}x - y &= 3 \\ 2x - 2y &= k\end{aligned}$$

have no solutions? Exactly one solution? Infinitely many solutions? Explain your reasoning.

**Section 1.2, exercise 2** Which of the following  $3 \times 3$  matrices are in row-echelon form?

(a)  $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

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

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

(d)  $\begin{bmatrix} 1 & 3 & 4 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

(e)  $\begin{bmatrix} 1 & 5 & -3 \\ 0 & 1 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

(f)  $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

**Section 1.2, exercise 6a)** Solve the following system by Gauss-Jordan elimination.

$$\begin{aligned}x_1 + x_2 + 2x_3 &= 8 \\ -x_1 - 2x_2 + 3x_3 &= 1 \\ 3x_1 - 7x_2 + 4x_3 &= 10\end{aligned}$$

**Section 1.2, exercise 8a)** Solve the following system by Gauss-Jordan elimination.

$$\begin{aligned}2x_1 - 3x_2 &= -2 \\ 2x_1 + x_2 &= 1 \\ 3x_1 + 2x_2 &= 1\end{aligned}$$

**Section 1.2, exercise 13b)** Solve the following homogeneous system of linear equations by any method.

$$3x_1 + x_2 + x_3 + x_4 = 0$$

$$5x_1 - x_2 + x_3 - x_4 = 0$$

**Section 1.3, exercise 6a)** Let

$$A = \begin{bmatrix} 3 & 0 \\ -1 & 2 \\ 1 & 1 \end{bmatrix}, \quad D = \begin{bmatrix} 1 & 5 & 2 \\ -1 & 0 & 1 \\ 3 & 2 & 4 \end{bmatrix}, \quad E = \begin{bmatrix} 6 & 1 & 3 \\ -1 & 1 & 2 \\ 4 & 1 & 3 \end{bmatrix}.$$

Compute the following (if possible).

$$(2D^T - E)A$$