(1) Determine whether the following matrices are invertible. If invertible, find the inverse.

(a) $A_1 = \begin{bmatrix} 2 & 3 \\ 1 & 2 \end{bmatrix}$

(b) $A_2 = \begin{bmatrix} 0 & 2 \\ 3 & 0 \end{bmatrix}$

(c) $A_3 = \begin{bmatrix} 2 & 0 \\ 4 & 2 \end{bmatrix}$

(d) $A_4 = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$

(e) $A_5 = \begin{bmatrix} 1 & 3 \\ 2 & -6 \end{bmatrix}$

(f) $A_6 = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$

(2) Write the system in matrix form, and then use the inverse of the coefficient matrix to find the solution of the system.

$$\begin{aligned} 2x_1 + 3x_2 &= 1 \\ x_1 + 2x_2 &= 5 \end{aligned}$$

(3) Write the system in matrix form, and then use the inverse of the coefficient matrix to find the solution of the system.

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