Gaussian Elimination and Row Echelon Form- HW Problems

1. Identify which of the following matrices is in reduced row echelon form.

a. $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 1 \\ 0 & 1 & 4 \end{bmatrix}$

b. $\begin{bmatrix} 1 & 5 & 0 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{bmatrix}$

c. $\begin{bmatrix} 0 & 1 & -2 & 1 \\ 0 & 0 & 1 & 6 \\ 0 & 0 & 0 & 0 \end{bmatrix}$

d. $\begin{bmatrix} 1 & 0 & 0 & 4 & 2 \\ 0 & 1 & 0 & 1 & 1 \\ 0 & 0 & 1 & 2 & 0 \end{bmatrix}$

In problems 2-7 use Gaussian elimination to solve the systems of linear equations.

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

3. $x_1 + x_2 + x_3 = 3$

$3x_1 + 4x_2 + 2x_3 = 4$

$4x_1 + 5x_2 + 3x_3 = 7$

$2x_1 + 3x_2 + x_3 = 1$

4. $x_1 + x_2 + x_4 = 5$

$2x_1 + 3x_3 + 2x_4 = -2$

$x_1 - 2x_2 + 2x_3 + 4x_4 = -5$

$3x_1 + x_2 + 2x_3 = 2$

5. $3x_1 + 2x_2 + 3x_3 - 2x_4 = 1$

$x_1 + x_2 + x_3 = 3$

$x_1 + 2x_2 + x_3 - x_4 = 2$

6. $x_1 + x_2 + x_3 - x_4 = 2$

$2x_1 + 2x_2 - 2x_3 = 3$

$2x_1 + 2x_2 - x_4 = 2$

7. $x_1 + 2x_2 + x_4 = 5$

$2x_1 + 4x_2 - x_3 - x_4 = 6$

$-x_1 - 2x_2 + x_3 + 2x_4 = -2$

$3x_1 + 6x_2 - 2x_3 - 3x_4 = 7.$