

HW MATH227/1

1. Find the solution set of each of the following linear equations.

$$(a) \quad 7x - 5y = 3$$

$$(b) \quad -8x_1 + 2x_2 - 5x_3 + 6x_4 = 1$$

2. Find the augmented matrix for each of the following systems of linear equations.

$$(a) \quad \begin{array}{rrcr} 3x_1 & -2x_2 & = & -1 \\ 4x_1 & +5x_2 & = & 3 \\ 7x_1 & +3x_2 & = & 2 \end{array}$$

$$(b) \quad \begin{array}{rrrrcr} x_1 & +2x_2 & & -x_4 & +x_5 & = & 1 \\ & 3x_2 & +x_3 & & -x_5 & = & 2 \\ & & x_3 & +7x_4 & & = & 1 \end{array}$$

3. Find a system of linear equations corresponding to the augmented matrix.

$$(a) \quad \left[\begin{array}{cccc} 3 & 0 & -2 & 5 \\ 7 & 1 & 4 & -3 \\ 0 & -2 & 1 & 7 \end{array} \right]$$

$$(b) \quad \left[\begin{array}{ccccc} 1 & 0 & 0 & 0 & 7 \\ 0 & 1 & 0 & 0 & -2 \\ 0 & 0 & 1 & 0 & 3 \\ 0 & 0 & 0 & 1 & 4 \end{array} \right]$$

4. In each part suppose that the augmented matrix for a system of linear equations has been reduced by row operations to the given reduced row-echelon form. Solve the system

$$(a) \quad \left[\begin{array}{cccc} 1 & 0 & 0 & -3 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 7 \end{array} \right]$$

$$(b) \quad \left[\begin{array}{cccc} 1 & -3 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array} \right]$$

5. Reduce

$$\begin{bmatrix} 2 & 1 & 3 \\ 0 & -2 & -29 \\ 3 & 4 & 5 \end{bmatrix}$$

to reduced row-echelon form without introducing any fractions.

6. Find two different row-echelon forms of

$$\begin{bmatrix} 1 & 3 \\ 2 & 7 \end{bmatrix}$$

7. Solve the system

$$\begin{array}{rrcr} 2x_1 & -x_2 & & = & \lambda x_1 \\ 2x_1 & -x_2 & +x_3 & = & \lambda x_2 \\ -2x_1 & +2x_2 & +x_3 & = & \lambda x_3 \end{array}$$

for x_1 , x_2 , and x_3 in the two cases $\lambda = 1$, $\lambda = 2$.