MATH3200: APPLIED LINEAR ALGEBRA
PRACTICE MODULE 22: MATRIX REPRESENTATIONS OF LINEAR SYSTEMS

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We will use here the notation and terminology of Lecture 12.

Consider the following system of linear equations:

$$\begin{array}{rcrcl} 3x_1 & + & 4x_2 & = & 10 \\ x_1 & - & x_2 & = & 1 \end{array} \tag{1}$$

Question 22.1: Find the coefficient matrix of system (1).

Question 22.2: Find the extended matrix of system (1).

Question 22.3: Express system (1) in matrix form.

Consider the following system of linear equations:

$$\begin{array}{rcrcl} x_1 & - & 4x_3 & = & 10 \\ x_2 & - & x_3 & = & 5 \\ 2x_1 & + & 2x_2 & = & 30 \end{array} \tag{2}$$

Question 22.4: Find the coefficient matrix of system (2).

Question 22.5: Find the extended matrix of system (2).

Question 22.6: Express system (2) in matrix form.

Question 22.7: Express the system with augmented matrix

$$[\mathbf{A}, \vec{\mathbf{b}}] = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 \\ 0 & -6 & -1 & 3 & 0 \\ 0 & 1 & 0 & -1 & -4 \\ 1 & 1 & 1 & 1 & 10 \end{bmatrix}$$

in explicit form (in the style of (1)).

Question 22.8: Express the system with augmented matrix

$$[\mathbf{A}, \vec{\mathbf{b}}] = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 \\ 0 & -6 & -1 & 3 & 0 \\ 0 & 1 & 0 & -1 & -4 \\ 1 & 1 & 1 & 1 & 10 \end{bmatrix}$$

in matrix form.