Name: **Tutorial time:**

Problem you want feedback on:

Please complete all problems below.

1. When you put the symbol "=" between two objects on the page, what are you saying about the relationship between those objects?

2. Each of the augmented matrices below is in reduced row-echelon form. For each matrix, indicate the following:

   (a) The *rank* of the augmented matrix.

   (b) The number of variables in the corresponding system of equations.

   (c) The number of parameters needed to write down the general solution.

   (d) The general solution to the system, if any.

   i. $\left[\begin{array}{ccc|c} 1 & 0 & -2 & 4 \\ 0 & 1 & 3 & -5 \\ 0 & 0 & 0 & 0 \end{array}\right]$

   iii. $\left[\begin{array}{ccc|c} 1 & 2 & 0 & 3 \\ 0 & 0 & 1 & 4 \\ 0 & 0 & 0 & 1 \end{array}\right]$

   ii. $\left[\begin{array}{cccc|c} 1 & -3 & 0 & 4 & 2 \\ 0 & 0 & 1 & -3 & 7 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$

   iv. $\left[\begin{array}{cccc|c} 0 & 1 & 0 & -1 & 4 \\ 0 & 0 & 1 & 0 & 2 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$

3. Determine the value(s) of a such that the system of equations given by the augmented matrix below has no solution, one solution, or infinitely many solutions, if possible.

$$\left[\begin{array}{ccc|c} a & 1 & 2 & 1 \\ 2 & 1 & 7 & 3 \\ 1 & 1 & 2 & 1 \end{array}\right]$$

4. Find the basic solutions to the homogeneous system of equations

$$\begin{array}{rcrcrcrcl} x_1 & - & 2x_2 & + & x_3 & - & 3x_4 & = & 0 \\ 2x_1 & + & x_2 & - & 4x_3 & + & x_4 & = & 0 \\ 3x_1 & - & x_2 & - & 3x_3 & - & 2x_4 & = & 0 \end{array}$$