Last name _____

First name _____

LARSON—MATH 601—HOMEWORK WORKSHEET (h02)
Systems of Equations.

1. Write this (non-homogeneous) system (over $\mathbb{Q}$) in the matrix form $AX = Y$. What are the matrices A, X, and Y?

$$\begin{aligned}
x_1 & -2x_2 & +x_3 & = & y_1 \\
2x_1 & +x_2 & +x_3 & = & y_2 \\
& +5x_2 & -x_3 & = & y_3
\end{aligned}$$

2. What is augmented matrix A'?

3. Use the row operations of scaling and adding a multiple of one row to another (so no row-exchanges) to find a row-reduced matrix that is row-equivalent to A'.

4. Write a system of equations that is equivalent to the original system.

5. This system does not always have solutions: it depends on the values of y_1, y_2, y_3. What requirements are there on y_1, y_2, y_3 for solutions to exist (these are called *consistency conditions*)?

6. Choose values of y_1, y_2, y_3 that satisfy the consistency conditions. Find the corresponding solution to the original system, and *check* that indeed this is a solution.