6.2 Inconsistent Systems and Dependent Equations

- **Special Cases**

At any time in the process of solving a system of equations using Gauss-Jordan Elimination:

1.) If a row becomes all ZEROs on the left side of the vertical line, and a NON-ZERO number on the right side of the vertical line, then the system has **no solution**.

2.) If a row becomes all ZEROs, then the system has **infinite number of solutions**.
(Your solutions will be equations. Two equations express *x* and *y* in terms of z.)

Ex. Solve each system of equations using Gauss-Jordan Elimination. State the solution.

a.) $\begin{cases} 2x - 4y + z = 3 \\ x - 3y + z = 5 \\ 3x - 7y + 2z = 12 \end{cases}$

b.) $\begin{cases} x+y-10z=-4 \\ x-7z=-5 \\ 3x+5y-36z=-10 \end{cases}$

❖ **Non-square Systems**

<u>Square Systems</u>: the number of equations = the number of variables
<u>Non-Square Systems</u>: the number of equations $\neq$ the number of variables

Ex. Solve each system of equations using Gauss-Jordan Elimination. State the solution.

$$\begin{cases} -2x-5y+10z=19 \\ x+2y-4z=12 \end{cases}$$

Ex. (#49) An accountant checks the reported earnings for a theater for three nightly performances against the number of tickets sold.

Night	**Children Tickets**	**Student Tickets**	**General Admission**	**Total Revenue**
1	80	400	480	$9,280
2	50	350	400	$7,800
3	75	525	600	$10,500

a.) Let x, y, and z represent the cost for children tickets, student tickets, and general admission tickets, respectively. Set up a system of equations to solve for x, y, and z.

b.) Set up the augmented matrix for the system and solve the system. (***Hint*:** To make the augmented matrix simpler to work with, consider dividing each linear equation by an appropriate constant.)