MATH 4A FALL 2015 WORKSHEET 1

My Info

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1. Solving Linear Systems

Example.

$$2x + 3y = 1$$
$$-x + 4y = 2$$

Elementary Row Operations.

Interchange:

Scale:

Replacement:

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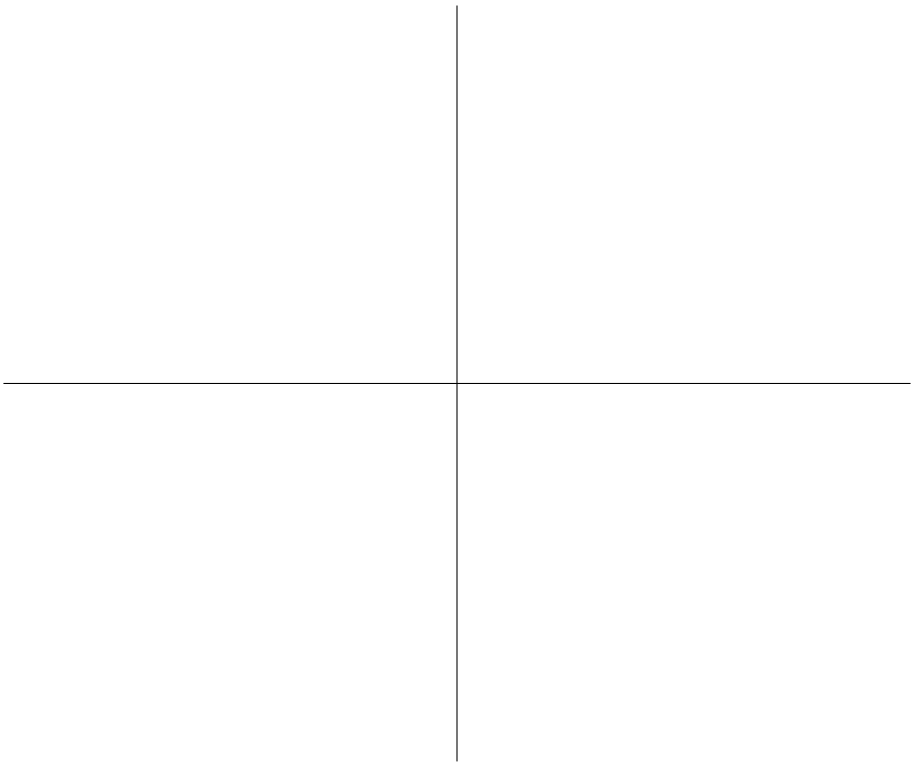
2. Nature of Solutions

Three Possibilities:

(1)
(2)
(3)

Examples.



$$2x + 3y = 1$$
$$-x + 4y = 2$$

$$2x + 3y = 1$$
$$=$$

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$$=$$

3. Echelon and Reduced Echelon Forms

Echelon Form

Echelon forms tell you

Reduced Echelon Form

Reduced echelon forms tell you

Example. Consider the following linear system.

$$\begin{aligned} 2x + 4y + z &= 0 \\ 0x + y - z &= 3 \\ 0x + 0y + 0z &= 0 \\ 2x + y + 4z &= -9 \end{aligned}$$

Write the above in augmented matrix form and reduce the matrix to an echelon form. What is the nature of the solutions?

Example. Consider the linear system given by the following augmented matrix.

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

Reduce the matrix to its reduced echelon form. What are the solutions?