## Worksheet 1

 Name:
 Solutions

Score:

Find a row echelon form and the reduced row echelon form (rref) of the following matrices:

$$\begin{bmatrix} -1 & -2 & 0 & | & 3\\ 10 & 15 & 0 & | & -10\\ 1 & 1 & 0 & | & 1 \end{bmatrix}$$
$$\begin{bmatrix} 1 & 0 & 0 & 5\\ 0 & 1 & 0 & -4\\ 0 & 0 & 0 & 0 \end{bmatrix}$$
$$\begin{bmatrix} 0 & 2 & 0 & | & -4\\ 9 & 11 & -16 & | & 15\\ 4 & 0 & -7 & | & 16 \end{bmatrix}$$
$$\begin{bmatrix} 1 & 0 & 0 & -3\\ 0 & 1 & 0 & -2\\ 0 & 0 & 1 & -4 \end{bmatrix}$$
$$\begin{bmatrix} -12 & 0 & -24 & 36 & | & 12\\ 6 & 0 & 12 & -18 & | & -6 \end{bmatrix}$$
$$\begin{bmatrix} -12 & 0 & -24 & 36 & | & 12\\ 6 & 0 & 12 & -18 & | & -6 \end{bmatrix}$$
$$\begin{bmatrix} 1 & 0 & 2 & -3 & -1\\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$
$$\begin{bmatrix} 0 & 1 & 0 & -3 & 5 & | & -5\\ -4 & -2 & 0 & 18 & -26 & | & 22\\ -8 & 0 & 1 & 25 & -37 & | & 20 \end{bmatrix}$$
$$\begin{bmatrix} 1 & 0 & 0 & -3 & 4 & -3\\ 0 & 1 & 0 & -3 & 5 & -5\\ 0 & 0 & 1 & 1 & -5 & -4 \end{bmatrix}$$

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Find the general solution, i.e., all the solutions possible to each of the above linear systems of equations.

Find the products AB of each of the matrices. Is BA defined?

• Problem:

• Problem:

$$A = \begin{bmatrix} -4 & -1 & 4 \\ 4 & -1 & -2 \end{bmatrix} B = \begin{bmatrix} 1 & 0 & -4 & 5 \\ 4 & -3 & -1 & -5 \\ 0 & 2 & -5 & -1 \end{bmatrix}$$
$$AB = \begin{bmatrix} -8 & 11 & -3 & -19 \\ 0 & -1 & -5 & 27 \end{bmatrix}$$
$$A = \begin{bmatrix} 4 & 5 \\ -3 & -2 \\ -3 & 1 \end{bmatrix} B = \begin{bmatrix} 2 & -5 \\ -4 & 2 \end{bmatrix}$$

$$\begin{bmatrix} -3 & 1 \end{bmatrix} \begin{bmatrix} -4 \\ -3 & 1 \end{bmatrix}$$
$$AB = \begin{bmatrix} -12 & -10 \\ 2 & 11 \\ -10 & 17 \end{bmatrix}$$

Find the products of the matrix A and the vector  $\vec{b}$ 

• Problem:

$$A = \begin{bmatrix} -1 & 0\\ 4 & -4\\ 3 & -2 \end{bmatrix} \vec{b} = \begin{bmatrix} -2\\ 2 \end{bmatrix}$$
$$A\vec{b} = \begin{bmatrix} 2\\ -16\\ -10 \end{bmatrix}$$

• Problem:

$$A = \begin{bmatrix} 5 & 3 & 5 \\ 4 & 0 & -1 \end{bmatrix} \vec{b} = \begin{bmatrix} -1 \\ -4 \\ 0 \end{bmatrix}$$
$$A\vec{b} = \begin{bmatrix} -17 \\ -4 \end{bmatrix}$$