DEFINITIONS 2

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Finish the following statements.

1. $\vec{p} = proj_{\vec{u}}(\vec{v})$ is the orthogonal projection of $\vec{v}$ onto $\vec{u}$ means
In $\Re^n$, $\vec{p}$ is the vector whose direction is the same as $\vec{u}$ and whose length is the component of $\vec{v}$ along $\vec{u}$ given by:

$$\vec{p} = proj_{\vec{u}}(\vec{v}) = \left(\frac{\vec{u} \cdot \vec{v}}{\|\vec{u}\|^2}\right)\vec{u}$$

$$\vec{p} = \alpha * \vec{v}$$

$$(\vec{u} - \vec{p}) \perp \vec{v}(orthogonal)$$

$$(\vec{u} - \vec{p}) + \vec{p} = \vec{u}$$

2. If we say two systems of equations are said to be equivalent we mean

Two systems of linear equations are said to be equivalent if they have the same solution set.

3. If we say two matrices are row equivalent we mean

Two matrices are said to be row equivalent if there is a sequence of row operations that transforms one into the other.

4. A matrix B is in reduced row echelon form means

A matrix is said to be in reduced row echelon form (rref) if:
1, any rows consisting entirely of zeros are at the bottom,
2, the first nonzero entry in a nonzero row (called a leading entry) is in a column to the left

of any leading entries below it,
3, every leading entry is a 1,
4, in any column with a leading 1 all other entries are 0.

5. If we say the rank of a matrix A is k ($rank\,(A) = k$) we mean
The rank of the matrix A(rank(A)) is the number of nonzeros in its reduced row echelon form of A (rref(A))