- The row space of A is the same as the column space of A^T. TRUE The rows become the columns of A^T so this makes sense.
- If B is an echelon form of A, and if B has three nonzero rows, then the first three rows of A form a basis of Row A. FALSE The nonzero rows of B form a basis. The first three rows of A may be linear dependent.
- The dimensions of the row space and the column space of A are the same, even if A if A is not square. TRUE by the Rank Theorem. Also since dimension of row space = number of nonzero rows in echelon form = number pivot columns = dimension of column space.

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- The sum of the dimensions of the row space and the null space of A equals the number of rows in A. FALSE Equals number of columns by rank theorem. Also dimension of row space = number pivot columns, dimension of null space = number of non-pivot columns (free variables) so these add to total number of columns.
- On a computer, row operations can change the apparent rank of a matrix. TRUE Due to rounding error.

- If B is any echelon form of A, the the pivot columns of B form a basis for the column space of A. FALSE It's the corresponding columns in A.
- Row operations preserve the linear dependence relations among the rows of A. FALSE For example, Row interchanges mess things up.
- The dimension of null space of A is the number of columns of A that are not pivot columns. TRUE These correspond with the free variables.
- The row space of A^T is the same as the column space of A. TRUE Columns of A go to rows of A^T.
- If A and B are row equivalent, then their row spaces are the same. TRUE. This allows us to find row space of A by finding the row space of its echelon form..

- If $A\mathbf{x} = \lambda\mathbf{x}$ for some vector $\mathbf{x}$, then λ is an eigenvalue of A. FALSE This is true as long as the vector is not the zero vector.
- A matrix A is not invertible if and only if 0 is an eigenvalue of A. TRUE
- A number c is an eigenvalue of A if and only if the equation $(A - cI)\mathbf{x} = \mathbf{0}$ has a nontrivial solution. TRUE This is a rearrangement of the equation $A\mathbf{x} = \lambda\mathbf{x}$.
- Finding an eigenvector of A may be difficult, but checking whether a given vector is in fact an eigenvector is easy. TRUE Just see if $A\mathbf{x}$ is a scalar multiple of $\mathbf{x}$.
- To find the eigenvalues of A, reduce A to echelon form. FALSE Row reducing changes the eigenvectors and eigenvalues.

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- If $A\mathbf{x} = \lambda\mathbf{x}$ for some scalar λ, then $\mathbf{x}$ is an eigenvector of A. FALSE The vector must be nonzero.‘
- If $\mathbf{v_1}$ and $\mathbf{v_2}$ are linearly independent eigenvectors, then they correspond to different eigenvalues. FALSE The converse if true, however.
- A steady-state vector for a stochastic matrix is actually an eigenvector. TRUE A steady state vector has the property that $Ax\mathbf{x} = \mathbf{x}$. In this case λ is 1.
- The eigenvalues of a matrix are on its main diagonal. FALSE This is only true for triangular matrices.
- An eigenspace of A is a null space of a certain matrix. TRUE The eigenspace is the nullspace of $A - \lambda I$.