1. In certain special cases, different sequences of row operations can reduce a matrix to different reduced row echelon forms.

We saw a theorem that says that each matrix is row equivalent to EXACTLY one matrix in RREF.

Points Earned: 1/1

Correct Answer: False

Your Response: False

2. A basic variable in a linear system is a variable that corresponds to a pivot column in the coefficient matrix.

Remember, the coefficient matrix is just the augmented matrix with the last column (representing the constants) thrown away. When we talk about "basic variables" we're not interested in the constants, so for this purpose we can just use the coefficient matrix.

Points Earned: 1/1

Correct Answer: True

Your Response: True

3. If two matrices are row equivalent, then they have the same pivot positions.

If two matrices are row equivalent, then they have the same RREF (think about why this is true). Pivot positions are defined in terms of the RREF, so they will be the same for both matrices.

Points Earned: 1/1

Correct Answer: True

Your Response: True

4. Two matrices which are of the same size and have the same pivot positions are row equivalent.

To see why this is false, first find two matrices which are in RREF and have the same sizes and pivot positions, but are not identical (this makes an excellent exercise!) If the statement were true, then these two matrices would have to be row equivalent. But each matrix has a UNIQUE reduced row echelon form, so this is impossible. (That is, two RREF matrices are row equivalent iff they are identical.) This is actually a nice problem and I think it would be a good idea to make sure you understand it completely. If you understand this, you're thinking like a mathematician.

Points Earned: 1/1

Correct Answer: False

Your Response: False

5. If a linear system has at least one free variable, then it has an infinite number of solutions.

It is possible that the system has a free variable, but is inconsistent. We saw an example in class.

Points Earned: 1/1

Correct Answer: False

Your Response: False

6. If a linear system has infinitely many solutions, then it must contain at least one free variable.

If none of the variables are free, then all of the equations reduce to the form "basic variable" = "number". This ensures that there is only one solution.

✔ **Points Earned:** 1/1
Correct Answer: True
Your Response: True

7. A system with more equations than variables cannot be consistent.

For example, the system {x=1, 2x=2} has two equations and one variable, but is certainly consistent.

✔ **Points Earned:** 1/1
Correct Answer: False
Your Response: False

8. Leading entries are generally not the same as pivot positions.

A pivot position of a matrix is a position occupied by a leading entry *in the RREF of the matrix*. In general, the two won't coincide.

✔ **Points Earned:** 1/1
Correct Answer: True
Your Response: True

9. A linear system is inconsistent if the last column of its augmented matrix is a pivot column.

If the last column of the augmented matrix is a pivot column, then in RREF, the last column contains a leading entry. So the matrix has a row that looks like [0 0 0 .... 0 b] where b doesn't equal zero. By the existence and uniqueness theorem, this implies that the system is inconsistent.

✔ **Points Earned:** 1/1
Correct Answer: True
Your Response: True

10. A matrix might have more than one REF.

In fact, every matrix (except for the matrix whose entries are all zero) has an uncountably infinite number of REF's - just find one REF and start multiplying the rows by real numbers.

✔ **Points Earned:** 1/1
Correct Answer: True
Your Response: True