

1) Use Gaussian elimination to put the following system into RREF. You do not have to find the solution set.

$$\begin{pmatrix} 1 & 2 & 3 & 0 & 4 & 0 & 5 \\ 1 & 2 & 3 & 0 & 4 & 1 & 12 \\ 0 & 0 & 0 & 1 & 4 & 1 & 13 \end{pmatrix}$$

2) Answer each part with “True” or “False”.

- a) If a linear system has at least two solutions, it has infinitely many.
- b) A 5x3 system cannot have free variables.
- c) Every 3x5 system has three lead variables.
- d) Every consistent square system has a unique solution.
- e) Every consistent underdetermined system has infinitely many solutions.

3) Explain your answer to the last True-False question. Give a reason that it is always true, or give an example to show it can be false. Either way, include a few sentences in your answer.

Remarks and Answers: The average among the passing scores was about 50/60, which is a little high even for Quiz 1. The averages for the 3 parts separately were about 19, 15 and 16 out of 20. The unofficial scale is: A’s 54-60, B’s 48-53, C’s 42-47, D’s 36-41.

1) I meant to draw in a vertical line after column 6, but it’s not really important (see Ch 1.2 problem 1) and this didn’t seem to bother anyone. Answer:

$$\begin{pmatrix} 1 & 2 & 3 & 0 & 4 & 0 & 5 \\ 0 & 0 & 0 & 1 & 4 & 0 & 6 \\ 0 & 0 & 0 & 0 & 0 & 1 & 7 \end{pmatrix}$$

2) TFFFT

3) Since it is underdetermined, there are more variables than the number of equations, which is the maximum number of lead variables. So, there is a free variable, and infinitely many solutions.

You cannot justify statement 2e with an example, because it says “*Every ...*”. Somehow, a few people who answered “False” gave a pretty good discussion [even with the wrong conclusion], and I gave them a little partial credit. But this is very unusual.