

Math 110, Section 105, Quiz 2
Wednesday, September 6, 2017

This quiz will be graded out of 15 points; the True/False question is worth 3 points, and the exercise is worth 12 points. Please read the instructions carefully, and explain your work.

True or False. Mark the following statements as either true or false, or leave a blank if you don't know. A correct answer is worth +1 point, a blank is worth 0 points, and an incorrect answer is worth -1 points, so be smart about guessing!

- a. _____ Any subset of a linearly dependent set is linearly dependent.
- b. _____ Any matrix in $M_{n \times n}(F)$ can be written uniquely as a sum of an upper triangular matrix and a lower triangular matrix.
- c. _____ Questions about getting off of the waitlist for discussion section should be addressed to Prof. Stankova or your GSI, by email.

Solution. F F F



Exercise. Find a solution to the system of linear equations

$$\begin{aligned}3x_1 - 7x_2 + 4x_3 &= 10 \\x_1 - 2x_2 + x_3 &= 3 \\2x_1 - x_2 - 2x_3 &= 6\end{aligned}$$

Solution. We represent the system of equations using an augmented matrix, and compute a solution by using elementary row operations to reduce to row echelon form. To simplify computations, we start by swapping the first and the second equations, which does not change the solution to the system.

$$\begin{pmatrix} 1 & -2 & 1 & 3 \\ 3 & -7 & 4 & 10 \\ 2 & -1 & -2 & 6 \end{pmatrix} \sim \begin{pmatrix} 1 & -2 & 1 & 3 \\ 0 & -1 & 1 & 1 \\ 0 & 3 & -4 & 0 \end{pmatrix} \sim \begin{pmatrix} 1 & 0 & -1 & 1 \\ 0 & 1 & -1 & -1 \\ 0 & 0 & -1 & 3 \end{pmatrix} \sim \begin{pmatrix} 1 & 0 & 0 & -2 \\ 0 & 1 & 0 & -4 \\ 0 & 0 & 1 & -3 \end{pmatrix}$$

This gives a (unique) solution to the system of

$$(x_1, x_2, x_3) = (-2, -4, -3)$$