Math 54 Handout 3

June 19, 2018

Question 1.

Describe all solutions of $Ax = 0$ in parametric vector form, where

$$A = \begin{pmatrix} 1 & -4 & -2 & 0 & 3 & -5 \\ 0 & 0 & 1 & 0 & 0 & -1 \\ 0 & 0 & 0 & 0 & 1 & -4 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

Question 2.

Describe all solutions of $Ax = b$ in parametric vector form, where

$$A = \begin{pmatrix} 1 & 3 & -5 \\ 1 & 4 & -8 \\ -3 & -7 & 9 \end{pmatrix}, b = \begin{pmatrix} 4 \\ 7 \\ -6 \end{pmatrix}$$

Question 3.

For the following A, does the equation $Ax = 0$ have a nontrivial solution? Does the equation $Ax = b$ have at least one solution for every possible b?

1. A is a 4×3 matrix with three pivots.
2. A is a 3×4 matrix with three pivots.
3. A is a 3×3 matrix with two pivots.
4. A is a 2×2 matrix with two pivots.

Question 4.

Find the values of h for which the vectors are linearly independent.

$$v_1 = \begin{pmatrix} 1 \\ -1 \\ 4 \end{pmatrix}, v_2 = \begin{pmatrix} 3 \\ -5 \\ 7 \end{pmatrix}, v_3 = \begin{pmatrix} -1 \\ 5 \\ h \end{pmatrix}$$

Question 5.

Describe the possible echelon form of the matrix A, where A is a 4×2 matrix with the two columns not multiples of each other.

Question 6.

True or False: If $\{v_1, v_2, v_3, v_4\}$ is linearly independent, then so is $\{v_1, v_2, v_3\}$.

Question 7.

True or False: If $\{v_1, v_2, v_3\}$ is linearly independent, then so is $\{v_1, v_2, v_3, v_4\}$.

Question 8.

Let A be a matrix and let v_1, v_2 be two vectors. True or False: Suppose Av_1 and Av_2 are linearly independent, then v_1 and v_2 are linearly independent.