

MATH 4A FALL 2015 WORKSHEET 2

Name: _____ Section: 8AM 5PM 6PM 7PM

Announcement: I sent out an email last week about how your discussion section grade will be calculated. If you did not get it, let me know. I will send out another email this week about your TARDIS number and details on how to pick up and turn in Midterm 1.

Midterm1: It will cover §1.1 - §1.4 in the textbook. Below are some terms that you should to know.

§1.1: linear system, solution set of a linear system, equivalent linear systems, consistent/inconsistent linear systems, coefficient/augmented matrix of a linear system, elementary row operations, row equivalent matrices

§1.2: leading entry of a row, echelon/reduced echelon matrix, pivot position/colum of a matrix, basic/free variables in a linear system, parametric descriptions of solution sets

§1.3: column vector/vector, scalar, scalar multiple/linear combination of vectors, weights, span of a set of vectors

§1.4: matrix equation, matrix-vector product

Problems related to §1.1 and §1.2. (Each sub-question is worth 1 point and there are 15 sub-questions. You only need 7 points to get 1% for your discussion section grade.)

1. Consider the linear system (*) below.

a) Write down the augmented matrix of (*).

$$(*) \quad 2x - y + 3z + w = 4$$

$$3x - 5y + 7z - 3w = -12$$

$$x + 3y - z + 5w = 1$$

$$3x + 2y + 2z + 6w = 5$$

b) Reduce the matrix in a) to an echelon form. Show your work.

c) Based on your answer in b), answer the following questions.

(i) Circle the basic variables in the linear system (*): x y z w

(ii) Circle the free variables in the linear system (*): x y z w

(iii) The system (*) has: no solution a unique solution infinitely many solution

2. The matrix below is the augmented matrix of a linear system. Determine all value(s) of h such that the linear system is consistent.

$$\left[\begin{array}{cc|c} 1 & -3 & -2 \\ 5 & h & -7 \end{array} \right]$$

3. True or False. No justification is needed.

a) A basic variable in a linear system is a variable which corresponds to a pivot column in the coefficient matrix of the system. T F

b) Every matrix has a unique echelon form. T F

c) Every matrix has a unique reduced echelon form. T F

d) Two row equivalent matrices have the same size. T F

e) Let (*) be a linear system consisting of 5 variables and 8 equations and let A be its augmented matrix.

(i) The system (*) cannot have a unique solution. T F

(ii) The matrix A is an 8×5 matrix. T F

(iii) If the entries in the last column of A are all zeroes, then (*) is consistent. T F

(vi) If an echelon form of A has 4 pivots, then (*) has infinitely many solutions. T F

(v) If an echelon form of A has 6 pivots, then (*) is inconsistent. T F
