MATH 1300(A02) QUIZ 1 January 22, 2016 B05

NAME SOLUTIONS. ID Number

INSTRUCTIONS: Answer the following questions in the spaces provided below.

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[12] TOTAL

[2] **1.** Write the augmented matrix corresponding to the following system in the space to the right:

$$\begin{cases} x_1 = 2x_2 - 3x_3 + 4 \\ x_2 = -x_3 + 2 + 3x_1 \\ x_3 = 1 + 3x_2 - 2x_1 \end{cases}$$

$$\left[\begin{array}{ccc|c} 1 & -2 & 3 & 4 \\ -3 & 1 & 1 & 2 \\ 2 & -3 & 1 & 1 \end{array}\right]$$

[2] **2.** Consider the following two augmented matrices. Below each, describe, in words or symbols, the *next* elementary row operation to be performed on each, according to the method of Gaussian elimination with back substitution, as described in the textbook and in class. (Do not compute anything).

(a) $\left[\begin{array}{ccc|c} 1 & -2 & 3 & -4 \\ 0 & \textcircled{2} & -3 & 5 \\ 0 & 3 & 6 & 9 \end{array}\right]$

$\frac{1}{2}R_2$

(b) $\left[\begin{array}{cccc|c} 1 & -1 & 3 & -2 & 5 \\ 0 & 0 & \textcircled{1} & 2 & 4 \\ 0 & 0 & 0 & 0 & 0 \end{array}\right]$

$R_1 \leftarrow R_1 - 3R_2$.

[2] **3.** The following matrix is the reduced row echelon form of a system of linear equations with variables x, y, z. Write the general solution of the system in the space to the right.

$$\left[\begin{array}{ccc|c} 1 & -3 & 0 & 2 \\ 0 & 0 & 1 & -4 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

y is free: $y = t$.

$$\begin{cases} x = 2 + 3t \\ y = t \\ z = -4. \end{cases}$$

Or: $(x, y, z) = (2+3t, t, -4)$.

[4] **4.** Let $A = \begin{bmatrix} 2 & -1 & 3 \\ -3 & 2 & -1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & -2 \\ 2 & -3 \\ 4 & 2 \end{bmatrix}$. For each of the following expressions, calculate it if it is defined, and explain why it is not defined otherwise.

(a) $2A - B^T$

$$\begin{bmatrix} 1 & -4 & 2 \\ -6 & 0 & -3 \end{bmatrix}$$

(b) $B + 3A$

NOT DEFINED. B and $3A$ have different shapes

[2] **5.** Let $A = \begin{bmatrix} 3 & -1 & 4 \\ -1 & 5 & -9 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & 7 \\ 1 & 8 \\ 2 & -8 \end{bmatrix}$. Find row 2 of AB.

$$\begin{bmatrix} -11 & 105 \end{bmatrix}$$