MATH 54 FALL 2017: DISCUSSION 205/208 QUIZ#4

GSI: CHRISTOPHER EUR, DATE: 9/22/2017

STUDENT NAME: ______________________________

Problem 1. (6 points) Let A be a 2×3 matrix

$$A := \begin{bmatrix} 1 & 2 & -2 \\ 1 & 1 & -3 \end{bmatrix}$$

(a): Find a basis for the nullspace $\mathrm{nul}(A)$ of A.

(b): Find a basis for the column space $\mathrm{col}(A)$ of A.

(c): Verify the Rank Theorem in this example. The Rank Theorem states: for an $m \times n$ matrix, one always has $\dim \mathrm{col}(A) + \dim \mathrm{nul}(A) = n$.

Problem 2. (4 points) Suppose $A\vec{x} = \vec{b}$ has a solution $\vec{x}_0$. Show that if $\vec{x}_1$ is another solution to $A\vec{x} = \vec{b}$, then $\vec{x}_1 = \vec{x}_0 + \vec{u}$ for some vector $u \in \mathrm{nul}(A)$.

Please leave any questions/comments/concerns regarding the GSI's teaching.