MTH 166, Quiz #15, Fall 2017 Name KEY

Instructions: Show all work. Use exact answers unless specifically asked to round. Answer all parts of each question.

1. Row-reduce the matrix to reduced echelon form. If this matrix represented a system of equations, would the solution be inconsistent or consistent, and if applicable, dependent or independent?

$$\left[\begin{array}{ccc|c} 2 & 1 & 2 & 2 \\ 3 & -5 & -1 & 4 \\ 1 & -2 & -3 & -6 \end{array}\right]$$

$R_1 \leftrightarrow R_3$ $\left[\begin{array}{ccc|c} 1 & -2 & -3 & -6 \\ 3 & -5 & -1 & 4 \\ 2 & 1 & 2 & 2 \end{array}\right]$ $-3R_1 + R_2 \to R_2$, $-2R_1 + R_3 \to R_3$ $\left[\begin{array}{ccc|c} 1 & -2 & -3 & -6 \\ 0 & 1 & 8 & 22 \\ 0 & 5 & 8 & 14 \end{array}\right]$

$-5R_2 + R_3 \to R_3$ $\left[\begin{array}{ccc|c} 1 & -2 & -3 & -6 \\ 0 & 1 & 8 & 22 \\ 0 & 0 & -32 & -96 \end{array}\right]$ $-\frac{1}{32}R_3 \to R_3$ $\left[\begin{array}{ccc|c} 1 & -2 & -3 & -6 \\ 0 & 1 & 8 & 22 \\ 0 & 0 & 1 & 3 \end{array}\right]$

$-8R_3 + R_2 \to R_2$, $+3R_3 + R_1 \to R_1$ $\left[\begin{array}{ccc|c} 1 & -2 & 0 & 3 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 1 & 3 \end{array}\right]$ $2R_2 + R_1 \to R_1$ $\left[\begin{array}{ccc|c} 1 & 0 & 0 & -1 \\ 0 & 1 & 0 & -2 \\ 0 & 0 & 0 & 3 \end{array}\right]$

Consistent, independent.