

Math 105 - Finite Mathematics - J-term 2017

Quiz 9

January 19, 2017

Name: _____

Problem 1. Find the inverse of the following matrix

$$M = \begin{bmatrix} -5 & -2 & -2 \\ 2 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$$

$$\left[\begin{array}{ccc|ccc} -5 & -2 & -2 & 1 & 0 & 0 \\ 2 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 1 \end{array} \right] \begin{array}{l} R_1 \leftrightarrow R_3 \\ \sim \end{array} \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 0 & 0 & 1 \\ 2 & 1 & 0 & 0 & 1 & 0 \\ -5 & -2 & -2 & 1 & 0 & 0 \end{array} \right]$$

$$\begin{array}{l} R_2 - 2R_1 \rightarrow R_2 \\ R_3 + 5R_1 \rightarrow R_3 \end{array} \sim \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 0 & 0 & 1 \\ 0 & 1 & -2 & 0 & 1 & -2 \\ 0 & -2 & 3 & 1 & 0 & 5 \end{array} \right] \begin{array}{l} R_3 + 2R_2 \rightarrow R_3 \\ \sim \end{array} \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 0 & 0 & 1 \\ 0 & 1 & -2 & 0 & 1 & -2 \\ 0 & 0 & -1 & 1 & 2 & 1 \end{array} \right]$$

$$\begin{array}{l} -R_3 \rightarrow R_3 \\ \sim \end{array} \left[\begin{array}{ccc|ccc} 1 & 0 & 1 & 0 & 0 & 1 \\ 0 & 1 & -2 & 0 & 1 & -2 \\ 0 & 0 & 1 & -1 & -2 & -1 \end{array} \right] \begin{array}{l} R_1 - R_3 \rightarrow R_1 \\ R_2 + 2R_3 \rightarrow R_2 \\ \sim \end{array} \left[\begin{array}{ccc|ccc} 1 & 0 & 0 & 1 & 2 & 2 \\ 0 & 1 & 0 & -2 & -3 & -4 \\ 0 & 0 & 1 & -1 & -2 & -1 \end{array} \right]$$

$$M^{-1} = \begin{bmatrix} 1 & 2 & 2 \\ -2 & -3 & -4 \\ -1 & -2 & -1 \end{bmatrix}$$