

Name: \_\_\_\_\_

Date: \_\_\_\_\_

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## MA 162

Week 8 Recitation Worksheet (Tuesday)

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**You must show all work to receive full credit.**

1. Solve the following system of equations using the Gauss-Jordan method.

$$\begin{cases} w - 5x + 2y + 3z = 0 \\ -3w + 15x - 5y - 9z = -4 \\ 2w - 10x + y + 6z = 12 \end{cases}$$

2. The Gauss-Jordan method was applied to three different systems of equations to obtain the following augmented matrices in reduced row echelon form. Determine how many solutions each system has, and justify your answers.

$$(a) \left[ \begin{array}{ccc|c} 1 & -6 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{array} \right]$$

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

$$(c) \left[ \begin{array}{ccc|c} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & -4 \\ 0 & 0 & 1 & 8 \\ 0 & 0 & 0 & 0 \end{array} \right]$$

3. Let  $A = \begin{bmatrix} 3 & -5 \\ k & 8 \end{bmatrix}$ .

(a) For which value(s) of  $k$  is  $A$  non-invertible?

(b) For which value(s) of  $k$  is  $A$  invertible?

4. Use the Gauss-Jordan method to determine the inverse of the matrix

$$B = \begin{bmatrix} 1 & 2 & 3 \\ 0 & 4 & 0 \\ -5 & -6 & -7 \end{bmatrix}.$$

5. Use  $B^{-1}$  from #4 to solve the following system of equations.

$$\begin{cases} x + 2y + 3z = 8 \\ \phantom{x} + 4y = -16 \\ -5x - 6y - 7z = 32 \end{cases}$$