MA 138 Worksheet #16

Sections 9.1 & 9.2

2/29/24

Additional problems on linear systems (Section 9.1) — if needed

1 Solve the following system of linear equations by writing the corresponding augmented matrix and then by row reducing:

$$\begin{cases} x + 4y + 3z = 8 \\ x + 2y - z = 2 \\ 3x + 8y + z = 12 \end{cases}$$

2 Find the value of k for which the system is consistent

$$\begin{cases} -9x + 6y = 0 \\ -18x + ky = -3 \end{cases}$$

Problems on matrices (Section 9.2)

3 Consider the following three matrices: $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \\ 1 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 4 & -2 \\ 0 & 8 \\ -6 & 14 \end{bmatrix}$, and $C = \begin{bmatrix} 3 & -1 & -2 \\ 2 & 0 & 1 \end{bmatrix}$.

- Compute $3A - \frac{1}{2}B$.
- Compute the product AC.
- Compute the product CA.

4 For $A = \begin{bmatrix} -5 & 2 & 7 \\ 1 & 2 & 0 \\ 0 & 9 & -4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ determine the following matrices:

- $A - 2B$
- A^2
- B^4
- AB
- A^T

5 Find the values of a and b that satisfy the following matrix equation

$$\begin{bmatrix} 2 & 4a \\ 2 & 4 \end{bmatrix} \cdot \left(\begin{bmatrix} 0 & 2 \\ 6-a & 1 \end{bmatrix}^T \right) = \begin{bmatrix} -40 & 2 \\ 8 & b \end{bmatrix}$$