

Review for TEST 1

Linear Algebra MTH 3331

1a. Use back substitution to solve the system.

$$\begin{aligned}x + 2y + 3z - w &= 1 \\-y + z &= 1 \\z - w &= 2 \\2w &= 8\end{aligned}$$

See example 6 page 6.

1b. Solve the system of linear equations.

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

See example 7 page 7.

2. Find the solution set of the system of linear equations:

a. represented by the augmented matrix

$$\left[\begin{array}{cccc} 1 & -1 & 0 & 3 \\ 0 & 1 & -2 & -1 \\ 0 & 0 & 1 & -1 \end{array} \right]$$

b. given by the equations

$$\begin{aligned}2y + 3z &= 0 \\x + 2y - z &= 0 \\x + 4y + 2z &= 0\end{aligned}$$

See examples 5, 6 on pages 19–20.

3a. Calculate $4A + B$ if $A = \begin{bmatrix} 2 & -1 \\ 1 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 3 & 1 \end{bmatrix}$

3b. Solve for x in the matrix equation.

$$\begin{bmatrix} 1 & 2 & -3 \\ y & 4 & 1 \end{bmatrix} - 2 \begin{bmatrix} 2 & 6 & 3 \\ 1 & 2 & x \end{bmatrix} = 3 \begin{bmatrix} 1 & 3 & z \\ y & 1 & 1 \end{bmatrix}$$

See examples 3 on page 48 and problem 7 on page 56.

4. Find AB if $A = \begin{bmatrix} -1 & 3 \\ 4 & -5 \\ 0 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 \\ 0 & 7 \end{bmatrix}$.

See example 4 on page 49.

5. Solve matrix equation for A .

$$\begin{bmatrix} 2 & -1 \\ 3 & 2 \end{bmatrix} A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}.$$

See problem 27 on page 56.

6. If $A = \begin{bmatrix} 0 & -2 \\ 3 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & 2 \\ 1 & 0 \end{bmatrix}$, find $(4A)^T B$.

See example 9 on page 68.

7. If $A = \begin{bmatrix} -1 & 2 \\ 1 & 0 \end{bmatrix}$, find A^3

See example 7 on page 65.

8. Find the element c_{21} if $C = A^{-1} = \begin{bmatrix} 1 & -2 \\ 3 & -5 \end{bmatrix}^{-1}$.

See example 5 on page 77.

9. Use Gauss-Jordan elimination to find the inverse of $\begin{bmatrix} 3 & -1 & 2 \\ 1 & 0 & 4 \\ 2 & 4 & 10 \end{bmatrix}$.

See example 3 on page 75.

10. Find a LU -factorization of the matrix $A = \begin{bmatrix} 1 & 3 \\ 1 & 0 \end{bmatrix}$.

See example 5 on page 92.