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$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = A^{-1}B$$

2nd X (11/19/11 X)
- Edit, A, 3x3
- Edit, B, 3x1
A⁻¹B

Date _____
Algebra II

Solving Linear Systems with Three Variables Using Matrix Method

1. Which value is contained in the solution of the system shown below?

$$2x + y - z = 1$$

$$x - 2y + z = 0$$

$$3x - y + 2z = 7$$

- 1) 0
2) -1
3) 2
4) -3

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = A^{-1}B \quad \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 2 & 1 & -1 \\ 1 & -2 & 1 \\ 3 & -1 & 2 \end{pmatrix}^{-1} \begin{pmatrix} 1 \\ 0 \\ 7 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$$

2. Which value is *not* contained in the solution of the system shown below?

- 1) -2
2) 2
3) 3
4) -3

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = A^{-1}B$$

$$a + 5b - c = -20$$

$$4a - 5b + 4c = 19$$

$$-a - 5b - 5c = 2$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 1 & 5 & -1 \\ 4 & -5 & 4 \\ -1 & -5 & 5 \end{pmatrix}^{-1} \begin{pmatrix} -20 \\ 19 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -2 \\ -3 \\ 3 \end{pmatrix}$$

3. Which value is contained in the solution of the system shown below?

$$3x + y + z = -4$$

$$x - 2y + z = -5$$

$$2x + 3y - 2z = -9$$

- 1) -3
2) -4
3) -5
4) -9

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = A^{-1}B \quad \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 3 & 1 & 1 \\ 1 & -2 & 1 \\ 2 & 3 & -2 \end{pmatrix}^{-1} \begin{pmatrix} -4 \\ -5 \\ -9 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -4 \\ -3 \\ 5 \end{pmatrix}$$

4. Which value is *not* contained in the solution of the system shown below?

$$4x - 5y + 2z = 130$$

$$3x + 2y - 7z = -99$$

$$10x - 6y - 4z = 112$$

- 1) -8
2) -12
3) 10
4) 15

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = A^{-1}B \quad \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 4 & -5 & 2 \\ 3 & 2 & -7 \\ 10 & -6 & -4 \end{pmatrix}^{-1} \begin{pmatrix} 130 \\ -99 \\ 112 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 10 \\ -12 \\ 15 \end{pmatrix}$$

5. What is the solution of the system shown below?

$$6x - 3y + 2z = 78$$

$$4x + 2y - 5z = -40$$

$$-3x - 4y - 3z = -41$$

- 1) $x = 2, y = -4, z = 6$
2) $x = 7, y = -4, z = 12$
3) $x = 78, y = -40, z = -41$
4) $x = 6, y = 2, z = -3$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 6 & -3 & 2 \\ 4 & 2 & -5 \\ -3 & -4 & -3 \end{pmatrix}^{-1} \begin{pmatrix} 78 \\ -40 \\ -41 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 7 \\ -4 \\ 12 \end{pmatrix}$$

6. Solve the following system of equations for all values of x , y , and z using matrix method:

$$x + 3y + 5z = 45$$

$$6x - 3y + 2z = -10$$

$$-2x + 3y + 8z = 72$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = A^{-1}B \quad \begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 1 & 3 & 5 \\ 6 & -3 & 2 \\ -2 & 3 & 8 \end{pmatrix}^{-1} \begin{pmatrix} 45 \\ -10 \\ 72 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -2 \\ 4 \\ 7 \end{pmatrix} \quad \begin{matrix} x = -2 \\ y = 4 \\ z = 7 \end{matrix}$$

7. Solve the following system of equations for all values of x , y , and z using matrix method:

$$x + 2y = 3z - 2$$

$$2x - 7 = 2y - z$$

$$x + y + 2z = -4$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 1 & 2 & -3 \\ 2 & -2 & 1 \\ 1 & 1 & 2 \end{pmatrix}^{-1} \begin{pmatrix} -2 \\ 7 \\ -4 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 1 \\ -3 \\ -1 \end{pmatrix} \quad \begin{matrix} x = 1 \\ y = -3 \\ z = -1 \end{matrix}$$

8. Solve the following system of equations for all values of x , y , and z using matrix method:

$$-x + y + 2z = 7$$

$$2x + 3y - 1 = -z$$

$$-4y + z = 4 + 3x$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -1 & 1 & 2 \\ 2 & 3 & 1 \\ -3 & 4 & 1 \end{pmatrix}^{-1} \begin{pmatrix} 7 \\ 1 \\ 4 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -2 \\ 1 \\ 2 \end{pmatrix} \quad \begin{matrix} x = -2 \\ y = 1 \\ z = 2 \end{matrix}$$

9. Solve the following system of equations for all values of x , y , and z using matrix method:

$$2x - y + z = 7$$

$$x + 2y - 5z = -1$$

$$x = y + 6$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 2 & -1 & 1 \\ 1 & 2 & -5 \\ 1 & -1 & 0 \end{pmatrix}^{-1} \begin{pmatrix} 7 \\ -1 \\ 6 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 2 \\ -4 \\ -1 \end{pmatrix} \quad \begin{matrix} x = 2 \\ y = -4 \\ z = -1 \end{matrix}$$

10. Solve the following system of equations for all values of x , y , and z using matrix method:

$$y + 3z = 2x + 20$$

$$-3x + 21 + 2y = -z$$

$$3x - 2y + 3z = -9$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -2 & 1 & 3 \\ -3 & 2 & 1 \\ 3 & -2 & 3 \end{pmatrix}^{-1} \begin{pmatrix} 20 \\ -21 \\ -9 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} -98.5 \\ -154.5 \\ -7.5 \end{pmatrix} \quad \begin{matrix} x = -98.5 \\ y = -154.5 \\ z = -7.5 \end{matrix}$$

11. Solve the following system of equations for all values of x , y , and z using matrix method:

$$y = -2x + 14$$

$$3x - 4z = 2$$

$$3x - y = 16$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = A^{-1}B$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 2 & 1 & 0 \\ 3 & 0 & -4 \\ 3 & -1 & 0 \end{pmatrix}^{-1} \begin{pmatrix} 14 \\ 2 \\ 16 \end{pmatrix}$$

$$\begin{pmatrix} x \\ y \\ z \end{pmatrix} = \begin{pmatrix} 6 \\ 2 \\ 4 \end{pmatrix} \quad \begin{matrix} x = 6 \\ y = 2 \\ z = 4 \end{matrix}$$