PreCalculus Name_____

More Matrix Practice Notes

Date_____ Period____

Solve each system.

1) $-x - 3y + 2z = -16$
$-2x - 3y + 4z = -20$
$-2x + 3y - 3z = 25$

$$\left[\begin{array}{ccc|c} +1 & +3 & -2 & +16 \\ -2 & -3 & 4 & -20 \\ -2 & 3 & -3 & 25 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 16 \\ 2R_1+R_2 & 0 & 3 & 0 & 12 \\ 2R_1+R_3 & 0 & 9 & -7 & 57 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 16 \\ 0 & 3 & 0 & 12 \\ R_3-3R_2 & 0 & 0 & -7 & 21 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 16 \\ R_2/3 & 0 & 1 & 0 & 4 \\ R_3/-7 & 0 & 0 & 1 & -3 \end{array}\right]$$

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

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

2) $-x + y - 4z = -17$
$y - z = -2$
$x - 2y + 5z = -20$

$$\left[\begin{array}{ccc|c} +1 & -1 & +4 & +17 \\ 0 & 1 & -1 & -2 \\ 1 & -2 & 5 & -20 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -1 & 4 & 17 \\ 0 & 1 & -1 & -2 \\ -R_1+R_3 \quad 0 & -1 & 1 & -37 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & -1 & 4 & 17 \\ 0 & 1 & -1 & -2 \\ R_2+R_3 \quad 0 & 0 & 0 & -39 \end{array}\right]$$

No solution

3) $4x + 2y - 2z = 14$
$-3x - 2y + z = -6$
$-5x - 2y + 3z = -22$

$$\left[\begin{array}{ccc|c} 4 & 2 & -2 & 14 \\ -3 & -2 & 1 & -6 \\ -5 & -2 & 3 & -22 \end{array}\right]$$

$R_2 + R_1$

$$\left[\begin{array}{ccc|c} 1 & 0 & -1 & 8 \\ -3 & -2 & 1 & -6 \\ -5 & -2 & 3 & -22 \end{array}\right]$$

$$\left[\begin{array}{ccc|c} 1 & 0 & -1 & 8 \\ 0 & -2 & -2 & 18 \\ -5 & -2 & 3 & -22 \end{array}\right]$$

$3R_1 + R_2$

$$\left[\begin{array}{ccc|c} 1 & 0 & -1 & 8 \\ 0 & -2 & -2 & 18 \\ 0 & -2 & -2 & 18 \end{array}\right]$$

$5R_1 + R_3$

$$\left[\begin{array}{ccc|c} 1 & 0 & -1 & 8 \\ 0 & -2 & -2 & 18 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$R_3 - R_2$

Infinite solutions

Simplify. Write "undefined" for expressions that are undefined.

PEMDAS

4) $\begin{bmatrix} 0 & 0 & -1 \\ 6 & 6 & -3 \end{bmatrix} + \begin{bmatrix} -1 & 5 \\ -6 & -5 \end{bmatrix} \cdot \begin{bmatrix} 4 & -1 & -4 \\ 5 & 3 & 1 \end{bmatrix}$

2x2 ✓ 2x3 → (2x3)

$\begin{bmatrix} -4+25 & 1+15 & 4+5 \\ -24-25 & 6-15 & 24-5 \end{bmatrix}$

$\begin{bmatrix} 0 & 0 & -1 \\ 6 & 6 & -3 \end{bmatrix} + \begin{bmatrix} 21 & 16 & 9 \\ -49 & -9 & 19 \end{bmatrix} = \begin{bmatrix} 21 & 16 & 8 \\ -43 & -3 & 16 \end{bmatrix}$

Solve each equation or state if there is no unique solution.

5) $\begin{bmatrix} 16 \\ -10 \end{bmatrix} = 2B + \begin{bmatrix} 0 \\ -2 \end{bmatrix} - \begin{bmatrix} 0 \\ -2 \end{bmatrix}$

$- \begin{bmatrix} 0 \\ -2 \end{bmatrix}$

$\begin{bmatrix} 16 \\ -8 \end{bmatrix} = 2B$

2 ↳ scalar

$\frac{\begin{bmatrix} 16 \\ -8 \end{bmatrix}}{2}$

$B = \begin{bmatrix} 8 \\ -4 \end{bmatrix}$

6) $\begin{bmatrix} 2 \\ 2 \end{bmatrix} = \begin{bmatrix} -6 \\ -1 \end{bmatrix} + \begin{bmatrix} 4 & -2 \\ -3 & 3 \end{bmatrix} C$

$-\begin{bmatrix} -6 \\ -1 \end{bmatrix} - \begin{bmatrix} -6 \\ -1 \end{bmatrix}$

$=$

$\begin{bmatrix} 8 \\ 3 \end{bmatrix} = \begin{bmatrix} 4 & -2 \\ -3 & 3 \end{bmatrix} C$

↓ Find the inverse

i.) $43 - (-2)(-3) = 12 - 6 = 6$

ii) $\frac{1}{6}\begin{bmatrix} 3 & 2 \\ 3 & 4 \end{bmatrix}\begin{bmatrix} 8 \\ 3 \end{bmatrix} = C$

$\frac{1}{6}\begin{bmatrix} 24+6 \\ 24+12 \end{bmatrix} = \frac{1}{6}\begin{bmatrix} 30 \\ 36 \end{bmatrix} = \begin{bmatrix} 5 \\ 6 \end{bmatrix}$

7) $\begin{bmatrix} 10 & -8 \\ -3 & -19 \end{bmatrix} = \begin{bmatrix} -3 & -1 \\ 21 & 7 \end{bmatrix} Z - \begin{bmatrix} -10 & 6 \\ 3 & 8 \end{bmatrix}$ → A

No unique solution

i) Add But ii) Find inverse iii) det A $= -21 - -21 = 0$

Answers to More Matrix Practice Notes

1) $(-2, 4, -3)$

2) No solution

3) Infinitely many solutions

4) $\begin{bmatrix} 21 & 16 & 8 \\ -43 & -3 & 16 \end{bmatrix}$

5) $\begin{bmatrix} 8 \\ -4 \end{bmatrix}$

6) $\begin{bmatrix} 5 \\ 6 \end{bmatrix}$

7) No unique solution