PreCalculus Name________________________________

More Matrix Practice Notes

Date________________ Period____

Solve each system.

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

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

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

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 16 \\ 0 & 1 & 0 & 4 \\ 0 & 9 & -7 & 57 \end{array}\right] \begin{array}{l} \\ R_2/3 \\ \\ \end{array}$$

$$\left[\begin{array}{ccc|c} 1 & 3 & -2 & 16 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & -7 & 21 \end{array}\right] \begin{array}{l} \\ \\ -9R_2+R_3 \end{array}$$

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

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

$$\boxed{(x,y,z) = (-2,4,-3)}$$

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

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

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

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

No solution

$(12, -13, 4)$

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

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

$$\left[\begin{array}{ccc|c} 1 & 0 & -1 & 8 \\ -3 & -2 & 1 & -6 \\ -5 & -2 & 3 & -22 \end{array}\right] \quad R_2+R_1$$

$$\left[\begin{array}{ccc|c} 1 & 0 & -1 & 8 \\ 0 & -2 & -2 & 18 \\ 0 & -2 & -2 & 18 \end{array}\right] \quad \begin{array}{l} 3R_1+R_2 \\ 5R_1+R_3 \end{array}$$

$$\left[\begin{array}{ccc|c} 1 & 0 & -1 & 8 \\ 0 & -2 & -2 & 18 \\ 0 & 0 & 0 & 0 \end{array}\right] \quad -R_2+R_3$$

$$\left[\begin{array}{ccc|c} 1 & 0 & -1 & 8 \\ 0 & +1 & 1 & -9 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$x - z = 8$

$y + z = -9$

$x = 8 + z$

$y = -9 - z$

Infinitely many solutions

PEMDAS

multiply 1st

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

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

$2\times3 \quad 2\times2 \quad 2\times3 \Rightarrow 2\times3$

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

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

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

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

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

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

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

2×1

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

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

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

$\begin{bmatrix} 4 & -2 \\ -3 & 3 \end{bmatrix}^{-1} \begin{bmatrix} 8 \\ 3 \end{bmatrix} = C$

$\dfrac{1}{12-6} \begin{bmatrix} 3 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 8 \\ 3 \end{bmatrix} = C$

$\dfrac{1}{6} \begin{bmatrix} 24+6 \\ 24+12 \end{bmatrix} = \begin{bmatrix} 4+1 \\ 4+2 \end{bmatrix} = \begin{bmatrix} 5 \\ 6 \end{bmatrix} = C$

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

det = 0

No unique solution

