Algebra 2 Name_____

12.3 Practice - Inverse Matrices

Find the inverse of each matrix. (SHOW WORK!)

1) $\begin{bmatrix} -5 & -3 \\ 5 & 2 \end{bmatrix}^{-1}$

$\frac{1}{(-5)(2)-(-3)(5)}\begin{bmatrix} 2 & 3 \\ -5 & -5 \end{bmatrix}$

$\frac{1}{-10+15}\begin{bmatrix} 2 & 3 \\ -5 & -5 \end{bmatrix} = \begin{bmatrix} \frac{2}{5} & \frac{3}{5} \\ -1 & -1 \end{bmatrix}$

2) $\begin{bmatrix} -5 & -9 \\ 2 & 3 \end{bmatrix}^{-1}$

$\frac{1}{(-5)(3)-(-9)(2)}$

$\frac{1}{-15+18}\begin{bmatrix} 3 & 9 \\ -2 & -5 \end{bmatrix}$

$\frac{1}{3}\begin{bmatrix} 3 & 9 \\ -2 & -5 \end{bmatrix} = \begin{bmatrix} 1 & 3 \\ -\frac{2}{3} & -\frac{5}{3} \end{bmatrix}$

3) $\begin{bmatrix} -1 & -1 \\ -2 & 1 \end{bmatrix}^{-1}$

$\frac{1}{(-1)(1)-(-1)(-2)} = \frac{1}{-1-2}$

$-\frac{1}{3}\begin{bmatrix} 1 & 1 \\ 2 & -1 \end{bmatrix} = \begin{bmatrix} -\frac{1}{3} & -\frac{1}{3} \\ -\frac{2}{3} & \frac{1}{3} \end{bmatrix}$

4) $\begin{bmatrix} 7 & -2 \\ 5 & -2 \end{bmatrix}^{-1}$

$\frac{1}{(7)(-2)-(-2)(5)} = \frac{1}{-14+10}$

$-\frac{1}{4}\begin{bmatrix} -2 & 2 \\ -5 & 7 \end{bmatrix} = \begin{bmatrix} \frac{1}{2} & -\frac{1}{2} \\ \frac{5}{4} & -\frac{7}{4} \end{bmatrix}$

Solve each equation. You can use a graphing calculator.

5) $\begin{bmatrix} -1 & -1 \\ -1 & 2 \end{bmatrix} Z = \begin{bmatrix} 3 & -4 \\ 9 & -13 \end{bmatrix}$

$Z = \begin{bmatrix} -5 & 7 \\ 2 & -3 \end{bmatrix}$

6) $\begin{bmatrix} -16 & 4 \\ 4 & -1 \end{bmatrix} = \begin{bmatrix} -4 & -4 \\ -1 & 0 \end{bmatrix} X$

$X = \begin{bmatrix} -4 & 1 \\ 8 & -2 \end{bmatrix}$

7) $\begin{bmatrix} 4 & -2 \\ -3 & 4 \end{bmatrix} A = \begin{bmatrix} -16 & 36 \\ -8 & -37 \end{bmatrix}$

$A = \begin{bmatrix} -8 & 7 \\ -8 & -4 \end{bmatrix}$

8) $\begin{bmatrix} -1 & -1 \\ -6 & -5 \end{bmatrix} B = \begin{bmatrix} 5 & 1 \\ 30 & 1 \end{bmatrix}$

$B = \begin{bmatrix} -5 & 4 \\ 0 & -5 \end{bmatrix}$

Solve each system using matrices. Show the setup, then use a graphing calculator.

9) $-7y - 4z = -10$
$-5x + 8y + 2z = -39$
$5x - y - 5z = 7$

$\begin{bmatrix} 0 & -7 & -4 \\ -5 & 8 & 2 \\ 5 & -1 & -5 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -10 \\ -39 \\ 7 \end{bmatrix}$

$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 7 \\ -2 \\ 6 \end{bmatrix}$

10) $-8r + 8s + t = -16$
$r - 4s = -20$
$8r + 3t = 40$

$\begin{bmatrix} -8 & 8 & 1 \\ 1 & -4 & 0 \\ 8 & 0 & 3 \end{bmatrix}\begin{bmatrix} r \\ s \\ t \end{bmatrix} = \begin{bmatrix} -16 \\ -20 \\ 40 \end{bmatrix}$

$\begin{bmatrix} r \\ s \\ t \end{bmatrix} = \begin{bmatrix} 8 \\ 7 \\ -8 \end{bmatrix}$

11) $2x + 8z = -10$
$5x - 7y = 2$
$x - y = 0$

$\begin{bmatrix} 2 & 0 & 8 \\ 5 & -7 & 0 \\ 1 & -1 & 0 \end{bmatrix}\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -10 \\ 2 \\ 0 \end{bmatrix}$

$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} -1 \\ -1 \\ -1 \end{bmatrix}$

12) $-6a + 2b + 4c = 16$
$a = 3b - 10$
$c = 6b - 13$

$\begin{bmatrix} -6 & 2 & 4 \\ 1 & -3 & 0 \\ 0 & -6 & 1 \end{bmatrix}\begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} 16 \\ -10 \\ -13 \end{bmatrix}$

$\begin{bmatrix} a \\ b \\ c \end{bmatrix} = \begin{bmatrix} -7 \\ 1 \\ -7 \end{bmatrix}$