

Matrix Operations More Practice

Name Key

Period _____ Date _____

Find the answers to #1-6 **by hand**, using the following matrices:

$$A = \begin{bmatrix} 2 & 3 & 1 \\ -1 & 1 & 4 \\ 5 & -2 & 3 \end{bmatrix}$$

$$B = \begin{bmatrix} -1 & 5 & 6 \\ 2 & -7 & -2 \\ 4 & 4 & 2 \end{bmatrix}$$

$$C = \begin{bmatrix} 8 & 10 & -9 \\ -6 & 12 & 14 \end{bmatrix}$$

1. $A + B$

$$\begin{bmatrix} 1 & 8 & 7 \\ 1 & -6 & 2 \\ 9 & 2 & 5 \end{bmatrix}$$

2. $B - A$

$$\begin{bmatrix} -3 & 2 & 5 \\ 3 & -8 & -6 \\ -1 & 6 & -1 \end{bmatrix}$$

3. $-2A$

$$\begin{bmatrix} -4 & -6 & -2 \\ 2 & -2 & -8 \\ -10 & 4 & -6 \end{bmatrix}$$

4. $3A + 4B$

$$\begin{bmatrix} 2 & 29 & 27 \\ 5 & -25 & 4 \\ 31 & 10 & 17 \end{bmatrix}$$

5. CA

$$\begin{bmatrix} -39 & 52 & 21 \\ 46 & -34 & 84 \end{bmatrix}$$

6. BA

$$\begin{bmatrix} 23 & -10 & 37 \\ 1 & 3 & -32 \\ 14 & 12 & 26 \end{bmatrix}$$

In #7-12, solve the equation for each unknown variable.

$$7. \begin{bmatrix} 2y & -1 \\ -6 & 0 \end{bmatrix} + \begin{bmatrix} 5 & 4 \\ x & 8 \end{bmatrix} = \begin{bmatrix} -5 & 3 \\ -7 & 8 \end{bmatrix}$$

$$2y + 5 = -5$$

$$2y = -10$$

$$\boxed{y = -5}$$

$$-6 + x = -7$$

$$\boxed{x = -1}$$

$$8. \begin{bmatrix} 3x & -2 \\ -1 & 8 \end{bmatrix} + \begin{bmatrix} -4 & 0 \\ -7 & -8 \end{bmatrix} = \begin{bmatrix} -16 & -2 \\ y & 0 \end{bmatrix}$$

$$3x - 4 = -16$$

$$3x = -12$$

$$\boxed{x = -4}$$

$$\boxed{-8 = y}$$

$$9. 2x \begin{bmatrix} -3 & 4 \\ -11 & 5 \end{bmatrix} = \begin{bmatrix} 12 & -16 \\ y & -20 \end{bmatrix}$$

$$-6x = 12$$

$$\boxed{x = -2}$$

$$-22x = y$$

$$-22(-2) = y$$

$$\boxed{44 = y}$$

$$\begin{bmatrix} -6x & 8x \\ -22x & 10x \end{bmatrix} = \begin{bmatrix} 12 & -16 \\ y & -20 \end{bmatrix}$$

$$10. \begin{bmatrix} -2x & -8 \\ -10 & -9 \end{bmatrix} = \begin{bmatrix} 6 & y \\ -10 & 9 \end{bmatrix}$$

$$-2x = 6$$

$$\boxed{x = -3}$$

$$\boxed{-8 = y}$$

$$11. \begin{bmatrix} x & 2y & 4 \\ 3 & x & -5 \\ 4 & 3z & y \end{bmatrix} \begin{bmatrix} -4 \\ 6 \\ 1 \end{bmatrix} = \begin{bmatrix} 12 \\ 7 \\ 40 \end{bmatrix}$$

3x3 3x1

$$\begin{bmatrix} -4x + 12y + 4 \\ -12 + 6x - 5 \\ -16 + 18z + y \end{bmatrix} = \begin{bmatrix} 12 \\ 7 \\ 40 \end{bmatrix}$$

$$-12 + 6x - 5 = 7$$

$$6x - 17 = 7$$

$$6x = 24$$

$$\boxed{x = 4}$$

$$-4x + 12y + 4 = 12$$

$$-4(4) + 12y + 4 = 12$$

$$12y - 12 = 12$$

$$12y = 24$$

$$\boxed{y = 2}$$

$$-16 + 18z + y = 40$$

$$-16 + 18z + 2 = 40$$

$$18z - 14 = 40$$

$$18z = 54$$

$$\boxed{z = 3}$$

$$12. \begin{bmatrix} 4 & 1 & -3 \\ 0 & 2 & 5 \\ 0 & 0 & 4 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 8 \\ -2 \\ 8 \end{bmatrix}$$

$$\begin{bmatrix} 4x + y - 3z \\ 0x + 2y + 5z \\ 0x + 0y + 4z \end{bmatrix} = \begin{bmatrix} 8 \\ -2 \\ 8 \end{bmatrix}$$

$$4z = 8$$

$$\boxed{z = 2}$$

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

$$2y + 5(2) = -2$$

$$2y = -12$$

$$\boxed{y = -6}$$

$$4x + y - 3z = 8$$

$$4x - 6 - 3(2) = 8$$

$$4x = 20$$

$$\boxed{x = 5}$$