

5.3 Multiplying Matrices

Homework

Name: _____

Date: _____ Block: _____

State the dimensions of each matrix.

$$1.) A = \begin{bmatrix} 2 & 1 \\ -8 & 5 \end{bmatrix}$$

2×2

What is the value of element a_{11} ?

2

$$2.) B = \begin{bmatrix} -5 & 3 & 1 \\ 4 & 0 & 2 \end{bmatrix}$$

2×3

What is the value of element b_{23} ?

2

$$3.) C = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix} \quad 3 \times 1$$

What is the value of element c_{31} ?

-1

Add the following matrices.

$$4.) \begin{bmatrix} 5 & 8 & -2 \\ 0 & 4 & -1 \\ 3 & 1 & 0 \end{bmatrix} + \begin{bmatrix} 3 & -2 & 4 \\ -4 & 2 & 3 \\ 7 & -8 & 4 \end{bmatrix}$$

$$\begin{bmatrix} 8 & 6 & 2 \\ -4 & 6 & 2 \\ 10 & -7 & 4 \end{bmatrix}$$

$$5.) \begin{bmatrix} -1 & 0 \\ 2 & 1 \\ 4 & -3 \end{bmatrix} + \begin{bmatrix} 5 & -2 \\ -1 & 1 \\ -3 & 2 \end{bmatrix}$$

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

Subtract the following matrices.

$$6.) \begin{bmatrix} 5 & 8 & -2 \\ 0 & 4 & -1 \\ 3 & 1 & 0 \end{bmatrix} - \begin{bmatrix} 3 & -2 & 4 \\ -4 & 2 & 3 \\ 7 & -8 & 4 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 10 & -6 \\ 4 & 2 & -4 \\ -4 & 9 & -4 \end{bmatrix}$$

$$7.) \begin{bmatrix} -1 & 0 \\ 2 & 1 \\ 4 & -3 \end{bmatrix} - \begin{bmatrix} 5 & -2 \\ -1 & 1 \\ -3 & 2 \end{bmatrix}$$

$$\begin{bmatrix} -6 & 2 \\ 3 & 0 \\ 7 & -5 \end{bmatrix}$$

Multiply the following matrices.

$$8.) -2 \begin{bmatrix} 5 & 8 & -2 \\ 0 & 4 & -1 \\ 3 & 1 & 0 \end{bmatrix}$$

$$\begin{bmatrix} -10 & -16 & 4 \\ 0 & -8 & 2 \\ 6 & -2 & 0 \end{bmatrix}$$

$$9.) \frac{1}{2} \begin{bmatrix} -1 & 0 \\ 2 & 1 \\ 4 & -3 \end{bmatrix}$$

$$\begin{bmatrix} -\frac{1}{2} & 0 \\ 1 & \frac{1}{2} \\ 2 & -\frac{3}{2} \end{bmatrix}$$

Simplify the following expressions.

$$10.) -3 \begin{bmatrix} 5 & 8 & -2 \\ 0 & 4 & -1 \\ 3 & 1 & 0 \end{bmatrix} + 5 \begin{bmatrix} 3 & -2 & 4 \\ -4 & 2 & 3 \\ 7 & -8 & 4 \end{bmatrix}$$

$$\begin{bmatrix} -15 & -24 & 6 \\ 0 & -12 & 3 \\ -9 & -3 & 0 \end{bmatrix} + \begin{bmatrix} 15 & -10 & 20 \\ -20 & 10 & 15 \\ 35 & -40 & 20 \end{bmatrix}$$

$$\begin{bmatrix} 0 & -34 & 26 \\ -20 & -2 & 18 \\ 26 & -43 & 20 \end{bmatrix}$$

$$11.) 2 \begin{bmatrix} -1 & 0 \\ 2 & 1 \\ 4 & -3 \end{bmatrix} - 2 \begin{bmatrix} 5 & -2 \\ -1 & 1 \\ -3 & 2 \end{bmatrix}$$

$$\begin{bmatrix} -2 & 0 \\ 4 & 2 \\ 8 & -6 \end{bmatrix} + \begin{bmatrix} -10 & 4 \\ 2 & -2 \\ 6 & -4 \end{bmatrix}$$

$$\begin{bmatrix} -12 & 4 \\ 6 & 0 \\ 14 & -10 \end{bmatrix}$$

Multiply the following matrices, if possible.

$$12) \begin{pmatrix} 2 & 3 \\ 4 & 7 \end{pmatrix} \cdot \begin{pmatrix} 6 & -8 \\ 12 & -5 \end{pmatrix} \downarrow$$

$2 \times 2 \quad 2 \times 2 = \text{Result } 2 \times 2$

$$\begin{bmatrix} 12+36 & -16+-15 \\ 24+84 & -32+-35 \end{bmatrix}$$

$$\begin{bmatrix} 48 & -31 \\ 108 & -67 \end{bmatrix}$$

$$14) \begin{pmatrix} -5 & 12 \\ 8 & -3 \\ -9 & -6 \end{pmatrix} \cdot \begin{pmatrix} 3 & -2 \\ -5 & 1 \\ 4 & 3 \end{pmatrix} \downarrow$$

$2 \times 2 \quad 3 \times 2$

Not
Defined

$$13) \begin{pmatrix} 13 \\ 5 \\ 8 \end{pmatrix} \cdot \begin{bmatrix} 6 & \frac{2}{10} & \frac{11}{4} \end{bmatrix} \downarrow$$

$3 \times 1 \quad 1 \times 3 = \text{Result } 3 \times 3$

$$\begin{bmatrix} 78 & \frac{13}{5} & \frac{143}{4} \\ 30 & 1 & \frac{55}{4} \\ 48 & \frac{16}{5} & 22 \end{bmatrix}$$

$$15) \begin{pmatrix} 9 & 8 \\ 4 & 3 \\ 5 & 6 \end{pmatrix} \cdot \begin{pmatrix} -10 & -2 \\ -4 & -4 \end{pmatrix} \downarrow$$

$3 \times 2 \quad 2 \times 2 = \text{Result } 3 \times 2$

$$\begin{bmatrix} -90+-32 & -18+-32 \\ -40+-12 & -8+-12 \\ -50+-24 & -10+-24 \end{bmatrix}$$

$$\begin{bmatrix} -122 & -50 \\ -52 & -20 \\ -74 & -34 \end{bmatrix}$$

$$16) \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} \cdot \begin{pmatrix} 2 & -6 & 10 \\ 4 & -8 & 12 \end{pmatrix} \downarrow$$

$2 \times 2 \quad 2 \times 3 = \text{Result } 2 \times 3$

$$\begin{bmatrix} 2+12 & -6+-24 & 10+36 \\ 10+28 & -30+-56 & 50+84 \end{bmatrix}$$

$$\begin{bmatrix} 14 & -30 & 46 \\ 38 & -86 & 134 \end{bmatrix}$$