Date Completed: _____
Mentor Initials: _____

Matrices (Basic)

1. Which of the following matrices is equal to $3\begin{bmatrix}-3 & 0\\ 6 & 7\end{bmatrix}$?

A. $\begin{bmatrix}-1 & 0\\ 2 & \frac{7}{3}\end{bmatrix}$

B. $\begin{bmatrix}0 & 3\\ 9 & 10\end{bmatrix}$

C. $\begin{bmatrix}-9 & 0\\ 18 & 21\end{bmatrix}$

D. $\begin{bmatrix}-9\\ 39\end{bmatrix}$

E. $\begin{bmatrix}-9 & 0\end{bmatrix}$

2. $\begin{bmatrix}3 & -7\\ 1 & 2\end{bmatrix} + \begin{bmatrix}1 & 5\\ -2 & 4\end{bmatrix} = ?$

A. $\begin{bmatrix}4 & -2\\ -1 & 6\end{bmatrix}$

B. $\begin{bmatrix}4 & -1\\ -2 & 6\end{bmatrix}$

C. $\begin{bmatrix}6 & -2\\ -1 & 4\end{bmatrix}$

D. $\begin{bmatrix}6 & -1\\ -2 & 4\end{bmatrix}$

E. $\begin{bmatrix}2 & -12\\ -1 & 6\end{bmatrix}$

3. Which of the following matrices is equal to $\begin{bmatrix}9 & -12\\ -7 & 10\end{bmatrix} - \begin{bmatrix}-8 & -16\\ -7 & 14\end{bmatrix}$?

A. $\begin{bmatrix}-3 & 24\\ 3 & -7\end{bmatrix}$

B. $\begin{bmatrix}-1 & -28\\ -14 & -4\end{bmatrix}$

C. $\begin{bmatrix}-1 & -28\\ -14 & 24\end{bmatrix}$

D. $\begin{bmatrix}2 & -2\\ 15 & 2\end{bmatrix}$

E. $\begin{bmatrix}17 & 4\\ 0 & -4\end{bmatrix}$

4. $4\begin{bmatrix} 2x & 3y \\ -z & 5 \end{bmatrix} = ?$

A. $\begin{bmatrix} (4+2x) & (4+3y) \\ (4-z) & 9 \end{bmatrix}$

B. $\begin{bmatrix} 8x & 12y \\ -4z & 20 \end{bmatrix}$

C. $\begin{bmatrix} 2x & \frac{4}{3}y \\ -\frac{1}{4}z & \frac{5}{4} \end{bmatrix}$

D. $\begin{bmatrix} (8x+12y) \\ (-4z+20) \end{bmatrix}$

E. $[(8x-4z) \quad (12y+20)]$

5. Matrices C and D are given below.

$$C = \begin{bmatrix} -3 & 2 \\ 7 & -4 \end{bmatrix} \quad D = \begin{bmatrix} -2 & 6 \\ 1 & 12 \end{bmatrix}$$

Which of the following matrices is $C - D$?

A. $\begin{bmatrix} -5 & 8 \\ 8 & 8 \end{bmatrix}$

B. $\begin{bmatrix} 1 & 4 \\ -6 & 16 \end{bmatrix}$

C. $\begin{bmatrix} 1 & -6 \\ 4 & 16 \end{bmatrix}$

D. $\begin{bmatrix} -1 & -6 \\ -4 & -16 \end{bmatrix}$

E. $\begin{bmatrix} -1 & -4 \\ 6 & -16 \end{bmatrix}$

6. Given that $x\begin{bmatrix} 3 & 6 \\ 2 & 4 \end{bmatrix} = \begin{bmatrix} a & b \\ c & 18 \end{bmatrix}$ for some real number x, what is $a + c$?

A. $\frac{27}{2}$

B. $\frac{45}{2}$

C. 27

D. 36

E. 45

7. What value of x satisfies the matrix equation below?

$$3\begin{bmatrix}2 & -6\\ 1 & x\end{bmatrix}+\begin{bmatrix}4 & 4\\ 1 & 8\end{bmatrix}=\begin{bmatrix}10 & -14\\ 4 & 17\end{bmatrix}$$

A. 2
B. 2.5
C. 3
D. 3.5
E. 12

8. Which of the following matrices is equal to:

$$\begin{bmatrix}-2a & 4b\\ 3 & 2a\end{bmatrix}+\begin{bmatrix}3a & -4b\\ -4 & 3b\end{bmatrix}?$$

A. $\begin{bmatrix}0 & (4b+3)\\ (43a+3b) & (-4b-4)\end{bmatrix}$

B. $\begin{bmatrix}-5a & 8b\\ 7 & (2a-3b)\end{bmatrix}$

C. $\begin{bmatrix}a & -1\\ 0 & 2a+3b\end{bmatrix}$

D. $\begin{bmatrix}a & 0\\ -1 & (2a+3b)\end{bmatrix}$

E. $\begin{bmatrix}(2a+3b) & -1\\ 0 & a\end{bmatrix}$

9. $\begin{bmatrix}-3 & 5\\ 6 & 2\end{bmatrix} * \begin{bmatrix}-1\\ 2\end{bmatrix} = ?$

A. $\begin{bmatrix}13\\ -2\end{bmatrix}$

B. $\begin{bmatrix}-6\\ 7\end{bmatrix}$

C. $\begin{bmatrix}3 & -5\\ 12 & 4\end{bmatrix}$

D. $\begin{bmatrix}3 & 4\\ 8 & 4\end{bmatrix}$

E. $\begin{bmatrix}3 & 10\\ -6 & 4\end{bmatrix}$

10. Given Matrix A with dimensions $g \times h$ and Matrix B with dimensions $h \times i$, what are the dimensions of the product Matrix AB?

A. $g \times h$
B. $h \times i$
C. $i \times g$
D. $g \times i$
E. Matrix AB does not exist.

11. Which of the following matrices is equal to the matrix product $[-3 \quad 5 \quad 4] * \begin{bmatrix} -1 \\ 3 \\ 2 \end{bmatrix}$?

A. $\begin{bmatrix} 3 \\ 15 \\ 8 \end{bmatrix}$

B. $\begin{bmatrix} -4 \\ 15 \\ -6 \end{bmatrix}$

C. $[3 \quad 15 \quad 8]$

D. $[-4 \quad 15 \quad -6]$

E. $[26]$

12. Given Matrix A with dimensions $g \times h$ and Matrix B with dimensions $h \times i$, what are the dimensions of the product Matrix BA?

A. $g \times h$
B. $h \times i$
C. $i \times g$
D. $g \times i$
E. Matrix BA does not exist.

13. The 2×2 Matrices L and M below are related to Matrix N by the equation $N = 3M - 4L$. What is Matrix N?

$$L = \begin{bmatrix} 4 & 6 \\ 2 & -3 \end{bmatrix} \qquad M = \begin{bmatrix} -6 & 3 \\ 2 & 7 \end{bmatrix}$$

A. $\begin{bmatrix} -10 & -3 \\ 0 & 10 \end{bmatrix}$

B. $\begin{bmatrix} 36 & 6 \\ -2 & -37 \end{bmatrix}$

C. $\begin{bmatrix} 34 & 15 \\ 2 & -33 \end{bmatrix}$

D. $\begin{bmatrix} -34 & -15 \\ -2 & 33 \end{bmatrix}$

E. $\begin{bmatrix} -36 & -6 \\ 2 & 37 \end{bmatrix}$