

## 11.2: (THE ALGEBRA OF MATRICES)

If  $C = \begin{bmatrix} -1 & 3 \\ 2 & 1 \\ -3 & -2 \end{bmatrix}$  and  $D = \begin{bmatrix} 0 & -1 & 2 \\ 1 & 2 & -4 \end{bmatrix}$ , then the sum of all elements of  $CD - I$ , is

- A) -4
- B) -14
- C) -7**
- D) 13
- E) 17

$A = \begin{bmatrix} 1 & -2 & 0 \\ 3 & 0 & -1 \\ 1 & 1 & 4 \end{bmatrix}$ . The element in the third row and second column of the matrix  $A^2 + 3A$  is

- A) 5**
- B) -2
- C) 0
- D) -1
- E) 7

Let  $A$  be a  $(3 \times 4)$  matrix and  $B$  be a  $(4 \times 3)$  matrix. Then which one of the following expressions is possible to find?

A)  $A(BA)$

B)  $A + B$

C)  $B^{-1}$

D)  $A^{-1}$

E)  $A(AB)$

If  $A = \begin{bmatrix} 0 & -2 & 7 \\ 5 & 4 & 3 \end{bmatrix}$ ,  $B = \begin{bmatrix} 3 & 1 \\ -1 & 5 \\ 6 & 0 \end{bmatrix}$ ,  $C = \begin{bmatrix} 40 & -10 \\ 28 & 23 \end{bmatrix}$ , and  $D = AB - C$ , then

the element in the second row and second column of the matrix  $D$  is equal to

(a) 2

(b) 48

(c) 0

(d) 28

(e) -10

If  $A, B,$  and  $C$  are matrices each of order  $n \times n,$  then which one of the following is TRUE?

(a)  $(AB)C = A(BC)$

(b)  $(A + B)^2 = A^2 + 2AB + B^2$

(c)  $(A + B) \cdot C = A + (B \cdot C)$

(d)  $C(AB) + C(BA) = 2C(AB)$

(e)  $(A - B)(A + B) = A^2 - B^2$

If  $X$  is a  $3 \times 3$  matrix,  $I$  is the  $3 \times 3$  identity matrix, and  $A = \begin{bmatrix} 1 & 4 & 7 \\ 2 & 5 & 8 \\ 3 & 6 & 9 \end{bmatrix}$  such

that  $2(X - A) = X - 3I,$  then the sum of all elements in the second row of matrix  $X$  is

A) 27

B) 18

C) 24

D) 31

E) 30

If  $A = \begin{bmatrix} 2 & -1 & 3 \\ 4 & 0 & 1 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & -1 \\ 0 & 3 \\ 2 & 1 \end{bmatrix}$ , then the sum of all the elements of the matrix  $AB =$

A) 9

B) 14

C) -5

D) 5

E) 3

If  $A = \begin{bmatrix} 1 & 2 & -5 \\ 2 & 4 & 3 \\ 3 & -1 & -2 \end{bmatrix}$ , then the element in the second row and third column of  $A^2$  is equal to:

A) -4

B) 4

C) -5

D) 11

E) 19

If  $A = \begin{bmatrix} -5 & 4 & 1 \\ -5 & 7 & 2 \end{bmatrix}$  and  $B = \begin{bmatrix} -8 & 6 & -4 \\ -1 & 5 & -3 \\ -7 & 5 & -1 \end{bmatrix}$ , then the sum of all the elements

of the third column of the matrix  $AB$  is

A) 4

B) 10

C) -6

D) 0

E) -3

If  $A = \begin{bmatrix} 2 & 0 & -2 \\ 3 & -1 & 0 \end{bmatrix}$  and  $B = \begin{bmatrix} 5 & 2 & -1 \\ 0 & -3 & 1 \\ -2 & 6 & 0 \end{bmatrix}$  then the element in the

second row and third column of the matrix  $AB$  is

A) 0

B) 2

C) -4

D) -2

E) 10

$$\text{If } \begin{bmatrix} x+2 & 8 & -3 \\ 1 & 2y & 2x+1 \\ 7 & -2 & y+2 \end{bmatrix} = \begin{bmatrix} 2x+6 & 8 & -3 \\ 1 & 18 & -7 \\ 7 & -2 & 11 \end{bmatrix}, \text{ then } x + y =$$

A) -13

B) -5

C) 5

D) 4

E) 13

$$\text{If } A = \begin{bmatrix} 2 & -1 & -2 & 5 \\ 3 & 0 & 1 & 4 \end{bmatrix}, B = \begin{bmatrix} -6 & 3 & 1 & 0 \\ 3 & 2 & 7 & 4 \end{bmatrix} \text{ and } 3A + 5X = 3X + B, \text{ then}$$

$$X =$$

a)  $\begin{bmatrix} -6 & 3 & \frac{7}{2} & -\frac{15}{2} \\ -3 & 1 & 2 & -4 \end{bmatrix}$

b)  $\begin{bmatrix} -4 & 2 & -1 & 3 \\ 6 & 2 & 8 & 8 \end{bmatrix}$

c)  $\begin{bmatrix} 0 & 0 & -5 & 13 \\ 12 & 2 & 10 & 16 \end{bmatrix}$

d)  $\begin{bmatrix} 0 & 0 & -\frac{5}{2} & \frac{15}{2} \\ 6 & 1 & 5 & 8 \end{bmatrix}$

e)  $\begin{bmatrix} -12 & 6 & 7 & -15 \\ -6 & 2 & 4 & -8 \end{bmatrix}$

If  $C = BA$  where  $A = \begin{bmatrix} 0 & 1 & 2 & 3 \\ 4 & 5 & 6 & 7 \\ 8 & 9 & 10 & 11 \end{bmatrix}$  and  $B = \begin{bmatrix} -1 & 0 & -2 \\ -3 & 4 & -5 \\ -6 & 7 & -8 \\ -9 & 10 & -11 \end{bmatrix}$  then  $c_{23}$ ,

the element in the second row and third column of  $C$  is equal to

A) 32

B) -32

C) 158

D) -158

E) 116

Given that  $A = \begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 2 & 0 \\ x & 1 \end{bmatrix}$ ,  $C = \begin{bmatrix} 0 & 0 \\ 6 & 1 \end{bmatrix}$ . If  $AB = 2A^2 - C$ , then  $x =$

A) -4

B) 4

C) 0

D) 2

E) -2