7.5 Operations on Matrices

Scalar Multiplication - If *c* is a scalar (or constant) and A is a matrix m x n, multiply each element in the matrix to find *c*A.

Ex. Let c=3 and

$$A=\begin{bmatrix}2&2&4\\-3&0&-1\\2&1&2\end{bmatrix}$$

$$3\begin{bmatrix}2&2&4\\-3&0&-1\\2&1&2\end{bmatrix}=\begin{bmatrix}6&6&12\\-9&0&-3\\6&3&6\end{bmatrix}$$

Find *c*A or 3A.

May 2-1:51 PM

Matrix Addition - Two matrices of the same order can be added together by adding their corresponding elements. 3x3 3x3 Row x Column

Ex.

$$A=\begin{bmatrix}2&2&4\\-3&0&-1\\2&1&2\end{bmatrix} \quad B=\begin{bmatrix}2&0&0\\1&-4&3\\-1&3&2\end{bmatrix}$$

Find *A* + *B*.

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

$$\begin{bmatrix}2&2&4\\-3&0&-1\\2&1&2\end{bmatrix}+\begin{bmatrix}-6&0&0\\-3&12&-9\\3&-9&-6\end{bmatrix}$$

Find *A*-3*B*

$$\begin{bmatrix}-4&2&4\\-6&12&-10\\5&-8&-4\end{bmatrix}$$

May 2-1:51 PM

Matrix Multiplication--a tad different!

$$\begin{bmatrix}1&2&3\\4&5&6\end{bmatrix}\begin{bmatrix}7&8\\9&10\\11&12\end{bmatrix}$$

$$\begin{bmatrix}1(7)+2(9)+3(11)&1(8)+2(10)+3(12)\\4(7)+5(9)+6(11)&4(8)+5(10)+6(12)\end{bmatrix}=\begin{bmatrix}58&64\\139&154\end{bmatrix}$$

Apr 23-8:51 AM

Let $\mathbf{A}=\begin{bmatrix}1&5&2\\3&-2&-1\end{bmatrix}$, $\mathbf{B}=\begin{bmatrix}0&1\\2&3\\5&6\end{bmatrix}$, $\mathbf{C}=\begin{bmatrix}0&-4\\1&-5\end{bmatrix}$

2x3 3x2 2x2

[A] Find **AB**. 2x2

$$\begin{bmatrix}0+10+8&1+15+10\\0+-4+-4&3+-6+-5\end{bmatrix}$$

$$\begin{bmatrix}18&26\\-8&-8\end{bmatrix}$$

Apr 28-2:00 PM

Let $\mathbf{A}=\begin{bmatrix}1 & 5 & 2\\ 3 & -2 & -1\end{bmatrix}$, $\mathbf{B}=\begin{bmatrix}0 & 1\\ 2 & 3\\ 4 & 5\end{bmatrix}$ $\mathbf{C}=\begin{bmatrix}0 & -4\\ 1 & -5\end{bmatrix}$

[B] Find **BA**.

2x3

3x2

3x2 2x3

3x3

$\begin{bmatrix}0+3 & 0+-2 & 0+1\\ 2+9 & 10+-6 & 4+-3\\ 4+15 & 20+-10 & 8+-5\end{bmatrix}=\begin{bmatrix}3 & -2 & -1\\ 11 & 4 & 1\\ 19 & 10 & 3\end{bmatrix}$

Apr 28-2:00 PM

Let $\mathbf{A}=\begin{bmatrix}1 & 5 & 2\\ 3 & -2 & -1\end{bmatrix}$, $\mathbf{B}=\begin{bmatrix}0 & 1\\ 2 & 3\\ 4 & 5\end{bmatrix}$ $\mathbf{C}=\begin{bmatrix}0 & -4\\ 1 & -5\end{bmatrix}$

[C] Find **BC**.

Apr 28-2:00 PM

Applications and Matrix Equations (HW)

Karin supplies two small campus coffee shops with homemade chocolate chip cookies, oatmeal cookies, and peanut butter cookies. The table to the right shows the number of each type of cookie, in dozens, that Karin sold in one week.

	Doc Lacys	U.Brew
Choc. Chip	8	15
Oatmeal	6	10
PB	4	3

Karin spends $3 for the ingredients for one dozen chocolate chip cookies, $1.50 for the ingredients for one dozen oatmeal cookies, and $2 for the ingredients for one dozen peanut butter cookies.

Apr 28-2:03 PM

[A] Write the information in the table as a 3x2 matrix **S**.

[B] Write a row matrix (a 1x3 matrix) **C** that represents the cost, per dozen, of the ingredients for each type of cookie.

[C] Find the product **CS**.

[D] State what the entries of **CS** represent.

Apr 28-2:04 PM

HOMEWORK

...matrix operations

7.5 (p. 536): 8, 12, 15

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