

7.2 Matrix Algebra

Target 8E: Represent a system of linear equations as a single matrix equation in a vector variable

Review of Prior Concepts

Organize this information into a chart:

Team A scored 4 3-point baskets, 22 2-point baskets, and 7 1-point baskets in a game against team B. Team B scored 8 3-point baskets, 18 2-point baskets, and 12 1-point baskets in the game.

Sample answer:

	3pt	2pt	1pt
Team A	4	22	7
Team B	8	18	12

More Practice

Introduction to Matrices

http://mathinsight.org/matrix_introduction

<http://www.basic-mathematics.com/introduction-to-matrices.html>

https://www.youtube.com/watch?v=F4bmfKqvT_4

<https://www.youtube.com/watch?v=0oGJTQCy4cQ>

Vocabulary

Matrix – a rectangular array of m rows and n columns



$$m \times n \text{ matrix} \rightarrow \begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a & \cdots & a \\ \vdots & \vdots & \ddots & \vdots \\ a_{m1} & a & \cdots & a \end{bmatrix}$$

An **element** of the matrix is a_{mn} where m is the row and n is the column

Order (size) of the matrix: $m \times n$



Example:

Given the matrix $\begin{bmatrix} 1 & -2 & 3 \\ 2 & 0 & 4 \end{bmatrix}$, identify the order, a_{21} , and a_{12} .

order: 2×3 $a_{21} = 2$ $a_{12} = -2$
2 rows 3 columns

(With your group members, do TI-Nspire Activity: Operating on Matrices Part I)

Adding/Subtracting Matrices

- The matrices need to have the same order
- Add/Subtract the corresponding elements

Example:

Given $A = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 0 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 5 & 0 \end{bmatrix}$, and $C = \begin{bmatrix} 3 & 0 & 5 \\ 1 & -2 & 7 \end{bmatrix}$, find $A + B$, $A - C$, and $4B$.

$A + B \rightarrow$ cannot be done
 bc
 $2 \times 3 \neq 2 \times 2$

$$A - C = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 0 & 4 \end{bmatrix} - \begin{bmatrix} 3 & 0 & 5 \\ 1 & -2 & 7 \end{bmatrix}$$

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

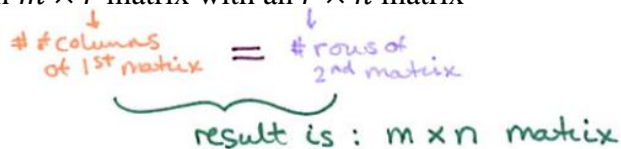
$$4B = 4 \begin{bmatrix} 1 & 2 \\ 5 & 0 \end{bmatrix}$$

$$4B = \begin{bmatrix} 4 & 8 \\ 20 & 0 \end{bmatrix}$$

(With your group members, do TI-Nspire Activity: Operating on Matrices Part II)

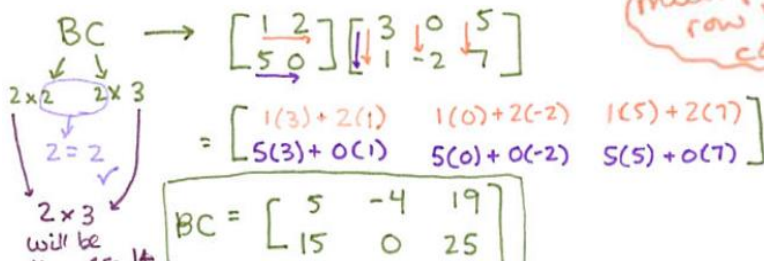
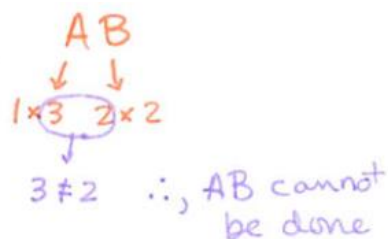
Multiplying Matrices

- Can only multiply an $m \times r$ matrix with an $r \times n$ matrix



Example:

Given $A = \begin{bmatrix} 1 & -2 & 3 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 5 & 0 \end{bmatrix}$, and $C = \begin{bmatrix} 3 & 0 & 5 \\ 1 & -2 & 7 \end{bmatrix}$, find AB and BC .



Multiply row by column

More Practice

Operations with Matrices

- <http://www.mathsisfun.com/algebra/matrix-introduction.html>
- <https://www.khanacademy.org/math/precalculus/precalc-matrices#adding-and-subtracting-matrices>
- http://www.algebra-lab.org/lessons/lesson.aspx?file=algebra_matrix_operations.xml
- <https://www.youtube.com/watch?v=xr6qsiEznKU>
- <https://www.youtube.com/watch?v=SPFWVUkxk8E>
- https://www.youtube.com/watch?v=kuixY2bCc_0
- <https://www.youtube.com/watch?v=sYlOjyPyX3g>

Homework Assignment

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