5-Minute Check

Simplify:

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

2. $2\begin{bmatrix} 3 \\ -2 \\ 6 \end{bmatrix} - 5\begin{bmatrix} 2 \\ -3 \\ 6 \end{bmatrix}$

3. Move ΔSTU 1 unit left and 4 units up if S (3, 1) T (4, 7) U (-1, 9)

5-Minute Check

Simplify:

1. $\begin{bmatrix} 3 & -2 & 5 \\ 2 & 7 & -5 \end{bmatrix} + \begin{bmatrix} -1 & 3 & 4 \\ 2 & -3 & 0 \end{bmatrix} = \begin{bmatrix} 2 & 1 & 9 \\ 4 & 4 & -5 \end{bmatrix}$

2. $2\begin{bmatrix} 3 \\ -2 \\ 6 \end{bmatrix} - 5\begin{bmatrix} 2 \\ -3 \\ 6 \end{bmatrix} = \begin{bmatrix} 6 \\ -4 \\ 12 \end{bmatrix} + \begin{bmatrix} -10 \\ 15 \\ -30 \end{bmatrix} = \begin{bmatrix} -4 \\ 11 \\ -18 \end{bmatrix}$

3. Move ΔSTU 1 unit left and 4 units up if S (3, 1) T (4, 7) U (-1, 9)

$-1(x) \quad +4(y)$ $S'(2,5)\ T'(3,11)\ U'(-2,13)$

$\begin{bmatrix} 3 & 4 & -1 \\ 1 & 7 & 9 \end{bmatrix} + \begin{bmatrix} -1 & -1 & -1 \\ 4 & 4 & 4 \end{bmatrix} = \begin{bmatrix} 2 & 3 & -2 \\ 5 & 11 & 13 \end{bmatrix}$

4-3 Multiplying Matrices

Objective:
Be able to multiply matrices

A& B are matrices:

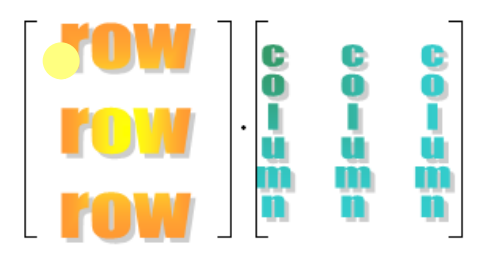
$$A_{mxn} \cdot B_{nxj} = AB_{mxj}$$

(Notice the n's have to match)

To multiply:
the number of columns in A must be equal to the number of rows of B.

usually AB does not equal BA

To Multiply:
Multiply the rows of the first times the columns of the second adding as you go.



So, the sum of the multiplications of row 1 elements with column 1 elements will give you the Row 1, Column 1 element of your answer

Example 1:

Find AB if $A=\begin{bmatrix}4 & 5\\ 7 & 2\\ 1 & 3\end{bmatrix}$ *and* $B=\begin{bmatrix}2 & 3\\ 5 & 6\end{bmatrix}$

$(A_{3x2}\cdot B_{2x2}=AB_{3x2})$

$A=\begin{bmatrix}4 & 5\\ 7 & 2\\ 1 & 3\end{bmatrix}$ $B=\begin{bmatrix}2 & 3\\ 5 & 6\end{bmatrix}$

$AB=\begin{bmatrix}8+25 & 12+30\\ 14+10 & 21+12\\ 2+15 & 3+18\end{bmatrix}$

$AB=\begin{bmatrix}33 & 42\\ 24 & 33\\ 17 & 21\end{bmatrix}$

Example 2:

Find CD if $C=\begin{bmatrix}3 & -5\\ 2 & 7\end{bmatrix}$ *and* $D=\begin{bmatrix}5 & 1 & -3\\ 8 & -4 & 9\end{bmatrix}$

$(C_{2x2}\cdot D_{2x3}=CD_{2x3})$

$C=\begin{bmatrix}3 & -5\\ 2 & 7\end{bmatrix}$ $D=\begin{bmatrix}5 & 1 & -3\\ 8 & -4 & 9\end{bmatrix}$

$CD=\begin{bmatrix}15+-40 & 3+20 & -9+-45\\ 10+56 & 2+28 & -6+63\end{bmatrix}$

$CD=\begin{bmatrix}-25 & 23 & -54\\ 66 & -26 & 57\end{bmatrix}$

Example 3:

Find AB if $A=\begin{bmatrix}4 & 5\\ 7 & 2\\ 1 & 3\end{bmatrix}$ *and* $B=\begin{bmatrix}5 & 1 & -3\\ 8 & -4 & 9\end{bmatrix}$

$AB=\begin{bmatrix}20+40 & 4+-20 & -12+45\\ 35+16 & 7+-8 & -21+18\\ 5+24 & 1+-12 & -3+27\end{bmatrix}$

$AB=\begin{bmatrix}60 & -16 & 33\\ 51 & -1 & -3\\ 29 & -11 & 24\end{bmatrix}$

Matrices that move sets of points:

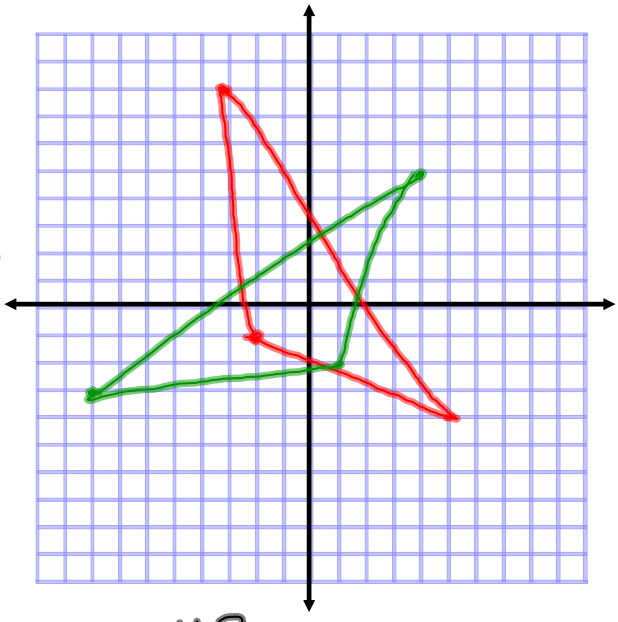
90° Counterclockwise Rotation:
Multiply by

$$\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}$$

180° Counterclockwise Rotation:
Multiply by

$$\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$$

Example 4:
Triangle ABC has endpoints
A(-3, 8) B (-2,-1) C (5,-4)
Rotate this 90° Counterclockwise



Multiply by

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

A B C

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

A' B' C'

p.202-203
#7-11, and 12-26 even