Algebra 2 3.6

Multiply matrices

Use the properties of matrix multiplication

row

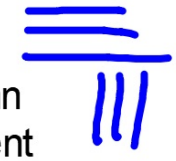
column

element

dimensions (of a matrix)

whiteboards

Clementine



$3A = 3\begin{bmatrix} 0 & -3 \\ 9 & 4 \end{bmatrix}$

$r \times c$

$\begin{bmatrix} 0 & -9 \\ 27 & 12 \end{bmatrix}$

2×2

- The table shows the scoring summary for Lisa Leslie, the WNBA's all-time scoring leader, during her highest scoring seasons. Her total baskets can be summarized

Lisa Leslie Regular Season Scoring				
Type	2005	2006	2008	2009
Field Goal	197	249	184	143
3-Point Field Goal	7	8	4	1
Free Throw	102	158	117	65

Source: WNBA

2 • 3 • 1 •

517 680

How would you calculate her point total for each season?

2pt
3pt
1pt

Lisa Leslie Regular Season Scoring				
Type	2005	2006	2008	2009
Field Goal	197	249	184	143
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Source: WNBA

Point Values

$$P = \begin{bmatrix} 2 & 3 & 1 \end{bmatrix}$$

2005 2006 2007 2008

Baskets

$$B = \begin{bmatrix} 197 & 249 & 184 & 143 \\ 7 & 8 & 4 & 1 \\ 102 & 158 & 117 & 65 \end{bmatrix}$$

1×3 3×4 517 680 497 354

dimensions have to work out...

dimensions must work out...

Example 1 Dimensions of Matrix Products

Determine whether each matrix product is defined. If so, state the dimensions of the product.

a. $A_{3\times 4}$ and $B_{4\times 2}$ yes 3x2

b. $A_{5\times 3}$ and $B_{3\times 4}$ no

whiteboards

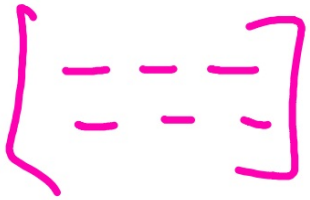
Determine whether each matrix product is defined. If so, state the dimensions of the product.

1. $A_{2\times 4} \cdot B_{4\times 3}$

2. $C_{5\times 4} \cdot D_{3\times 4}$

3. $E_{8\times 6} \cdot F_{6\times 10}$

2 x 3



no

8 x 10

GuidedPractice

1A. $A_{4 \times 6}$ and $B_{6 \times 2}$

1B. $A_{3 \times 2}$ and $B_{3 \times 2}$

Example 2 Multiply Square Matrices

Find XY if $X = \begin{bmatrix} 6 & -3 \\ -10 & -2 \end{bmatrix}$ and $Y = \begin{bmatrix} -5 & -4 \\ 3 & 3 \end{bmatrix}$ $= \begin{bmatrix} -39 & -33 \\ 44 & 34 \end{bmatrix}$

$-10 \cdot -4 + -2 \cdot 3$

$40 + -6$

r x c → add r:c

Matrix Multiplication

(My Darling Clementine)

Row by column, row by column,
Multiply them line by line.
Add them up to form a matrix,
Now you're doing it just fine!

2. Find UV if $U = \begin{bmatrix} 5 & 9 \\ -3 & -2 \end{bmatrix}$ and $V = \begin{bmatrix} 2 & -1 \\ 6 & -5 \end{bmatrix}$. $= \begin{bmatrix} 64 & -50 \\ -78 & 13 \end{bmatrix}$

$-3 \cdot -1 + -2 \cdot -5$

$3 + 10$

whiteboards

Find each product, if possible.

4. $\begin{bmatrix} 2 & 1 \\ 7 & -5 \end{bmatrix} \cdot \begin{bmatrix} -6 & 3 \\ -2 & -4 \end{bmatrix}$

8. $\begin{bmatrix} 9 & -2 \end{bmatrix} \begin{bmatrix} -2 & 4 \\ 6 & -7 \end{bmatrix}$ [-30 50]

$9 \cdot 4 + -2 \cdot -7$

$36 + 14$

Real-World Example 3 Multiply Matrices

SWIM MEET At a particular swim meet, 7 points were awarded for each first-place finish, 4 points for second, and 2 points for third. Find the total number of points for each school. Which school won the meet?

School	First Place	Second Place	Third Place
Central	4	7	3
Franklin	8	9	1
Hayes	10	5	3
Lincoln	3	3	6

7
4
2

8. $\begin{bmatrix} -8 & 7 & 4 \\ -5 & -3 & 8 \end{bmatrix} \cdot \begin{bmatrix} 10 & 6 \\ 8 & 4 \end{bmatrix}$ NP

$2 \times 3 \cdot 2 \times 2$

- 3.6 15-29o

55-57 all