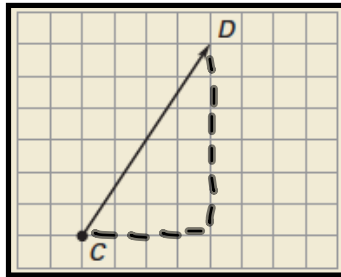


Bellwork
02/15/2012

1. Name the vector and write it in component form.



$$\vec{CD}$$
$$\langle 4, 6 \rangle$$

2. Use the point $M(8, -2)$. Find the component form of the vector that describes the translation to $M'(7, 5)$.

$$M'(7, 5), M(8, -2)$$

$$7-8, 5-(-2)$$

$$\langle -1, 7 \rangle$$

Geometry
9.2 Use Properties of Matrices
Standard(s): 9, 10

Vocabulary:

Matrix: A rectangular arrangement of numbers in rows and columns.

$$\begin{bmatrix} 2 & 6 & -8 \\ 1 & 0 & 4 \end{bmatrix}$$

Element: Each number in a matrix.

Entry

$$\begin{bmatrix} 2 & 6 & -8 \\ 1 & 0 & 4 \end{bmatrix}$$

Dimensions: The numbers of rows by the columns.

$$r \times c$$

$$2 \times 3$$

$$\begin{bmatrix} 2 & 6 & -8 \\ 1 & 0 & 4 \end{bmatrix}$$

To Add or Subtract Matrices:

Add or subtract corresponding elements.

Note: The matrices must have the same dimensions.

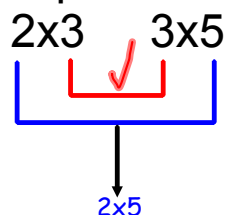


To Multiply Matrices:

Multiply the rows of the first matrix times the columns of the second matrix

Note: The matrices don't have to have the same dimensions.

The Multiplication Check



The Basics of Matrices

Find the dimensions of the matrices. Tell which matrices *could* be added together.

$$\begin{bmatrix} 9 & -1 & 0 \\ 3 & 4 & -2 \\ -2 & 6 & -7 \end{bmatrix}$$

$$3 \times 3$$

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

$$3 \times 2$$

$$[0]$$

$$1 \times 1$$

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

$$2 \times 2$$

Matrices can be created using any set of data!

For example, I can create a matrix using 3 students and their past two test grades!

	Test #1	Test #2
Student 1	98	76
Student 2	53	68
Student 3	74	81

$$\begin{bmatrix} 98 & 76 \\ 53 & 68 \\ 74 & 81 \end{bmatrix}$$

or you could write it like this...

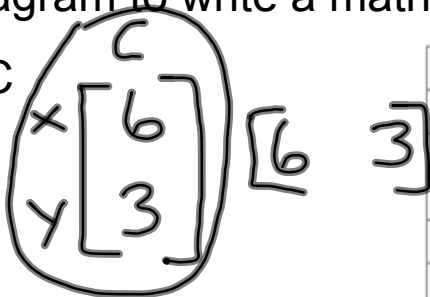
	Student 1	Student 2	Student 3
Test #1	98	53	74
Test #2	76	68	81

$$\begin{bmatrix} 98 & 53 & 74 \\ 76 & 68 & 81 \end{bmatrix}$$

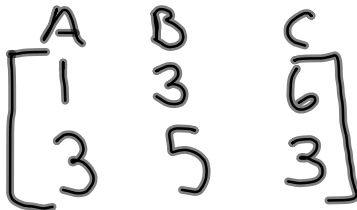
Writing Matrices

Use the diagram to write a matrix to represent the polygon.

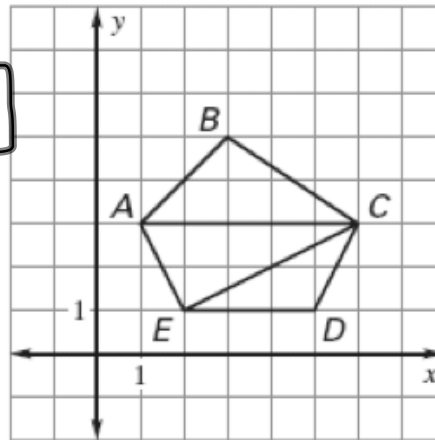
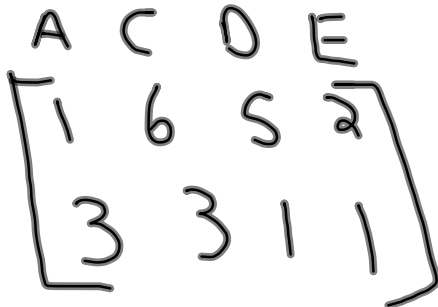
Point C



$\triangle ABC$



Quadrilateral ACDE



$A(1, 3)$
 $B(3, 5)$
 $C(6, 3)$
 $D(5, 1)$
 $E(2, 1)$

Add or Subtract Matrices

Add or subtract.

$$\begin{array}{c} 1 \times 2 \quad 1 \times 2 \\ [-3 \ 7] + [2 \ -5] \end{array}$$

$$-3+2 \quad 7+-5$$

$$[-1 \ 2]$$

$$\begin{array}{c} 2 \times 2 \quad 2 \times 2 \\ \begin{bmatrix} 1 & -4 \\ 3 & -5 \end{bmatrix} + \begin{bmatrix} 2 & -3 \\ 7 & -8 \end{bmatrix} \end{array}$$

$$\begin{array}{c} 1-2 \\ -4-3 \\ 3-7 \\ -5-8 \end{array}$$

$$\begin{bmatrix} -1 & -7 \\ -4 & -13 \end{bmatrix}$$

$$\begin{array}{c} 2 \times 2 \quad 2 \times 2 \\ \begin{bmatrix} 7 & 2 \\ -5 & 9 \end{bmatrix} + \begin{bmatrix} -8 & 1 \\ 4 & 0 \end{bmatrix} \end{array}$$

$$\begin{bmatrix} -1 & 3 \\ -1 & 9 \end{bmatrix}$$

$$\begin{bmatrix} 2 & 3 & 5 \\ 7 & -1 & 8 \end{bmatrix} + \begin{bmatrix} 12 & +2 & -1 \\ -6 & -3 & +4 \end{bmatrix}$$

$$\begin{bmatrix} -10 & 5 & 4 \\ 1 & -4 & 12 \end{bmatrix}$$

Represent a Translation Using Matrices

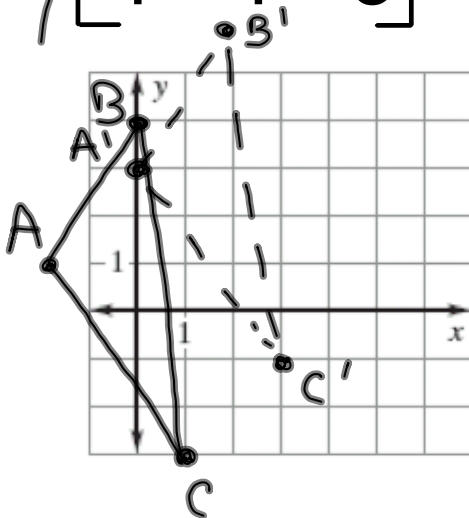
Find the image matrix that represents the translation of the polygon. Then graph the polygon and its image.

2 units right, 2 units up

$$\begin{matrix} X & A & B & C \\ Y & \begin{bmatrix} -2 & 0 & 1 \\ 1 & 4 & -3 \end{bmatrix} \end{matrix}$$

$$(x, y) \rightarrow (x+2, y+2)$$

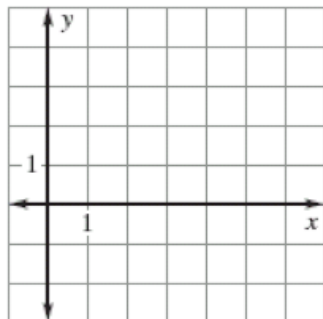
$$\begin{matrix} A' & B' & C' \\ \begin{bmatrix} -2+2 & 0+2 & 1+2 \\ 1+2 & 4+2 & -3+2 \end{bmatrix} & \begin{bmatrix} 0 & 2 & 3 \\ 3 & 6 & -1 \end{bmatrix} \end{matrix}$$



$$\begin{matrix} A'(0, 3) \\ B'(2, 6) \\ C'(3, -1) \end{matrix}$$

2 units down

$$\begin{matrix} D & E & F \\ \begin{bmatrix} 2 & 5 & 4 \\ 3 & 1 & 4 \end{bmatrix} \end{matrix}$$



Homework Assignment

Pg. 584 #1, 3-17

Multiplying Matrices

Use the multiplication check to find the products dimension. Then multiply.

$$\begin{bmatrix} 3 & -5 \\ 1 & 4 \end{bmatrix} \begin{bmatrix} 2 & -1 \\ 0 & 6 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 1 \end{bmatrix} \begin{bmatrix} -3 \\ -2 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 1 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} 2 & -4 \\ 5 & 1 \end{bmatrix}$$

Use Matrices in Real-World

Jenny and Arthur are going to the store to buy tomatoes, peppers, and cucumbers. If a tomato costs \$.89, a pepper \$.59, and a cucumber \$.45, use matrix multiplication to find the total amount each person spent.

Jenny	Arthur
3 Tomatoes	7 Tomatoes
2 peppers	4 peppers
4 cucumbers	2 cucumbers

$$\begin{bmatrix} 5 & 1 \end{bmatrix} \begin{bmatrix} -3 \\ -2 \end{bmatrix}$$

$$\begin{bmatrix} 5 & 1 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} 2 & -4 \\ 5 & 1 \end{bmatrix}$$

Homework Assignment

Worksheet 9.2B

