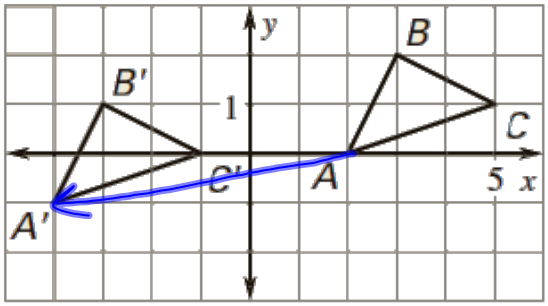
Warm Up

1. Write the component form of the vector that translates ΔABC to $\Delta A'B'C'$.



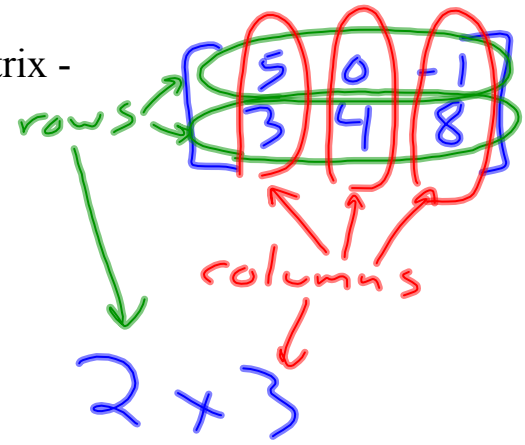
$\langle -6, -1 \rangle$

2. If $P(-8, 4)$ is translated by $(x, y) \rightarrow (x + 6, y + 1)$, what is the image of P ?

P. P' P'(-2, 5)

9-2 Use Properties of Matrices

Matrix -



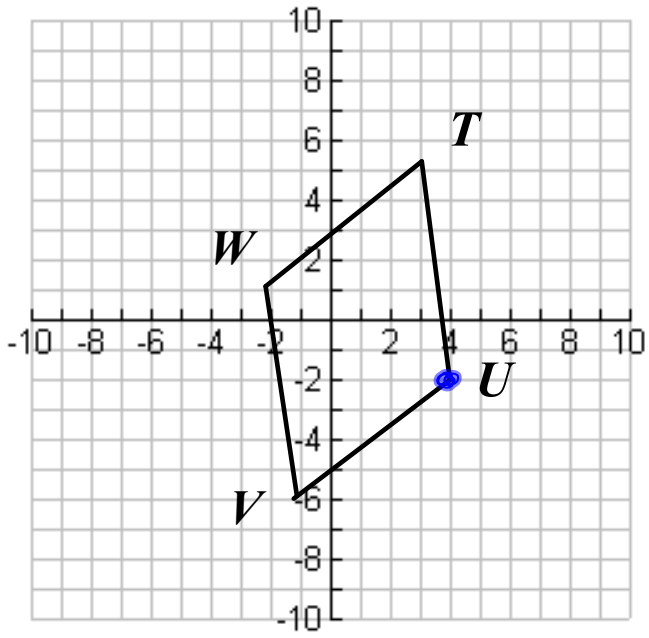
Ex 1 Write a matrix that represents:

point U

$$\begin{matrix} x \\ y \end{matrix}\begin{bmatrix} 4 \\ -2 \end{bmatrix}$$

quadrilateral $TUVW$

$$\begin{matrix} x \\ y \end{matrix}\begin{bmatrix} 3 & 4 & -1 & -2 \\ 5 & -2 & -6 & 1 \end{bmatrix}$$



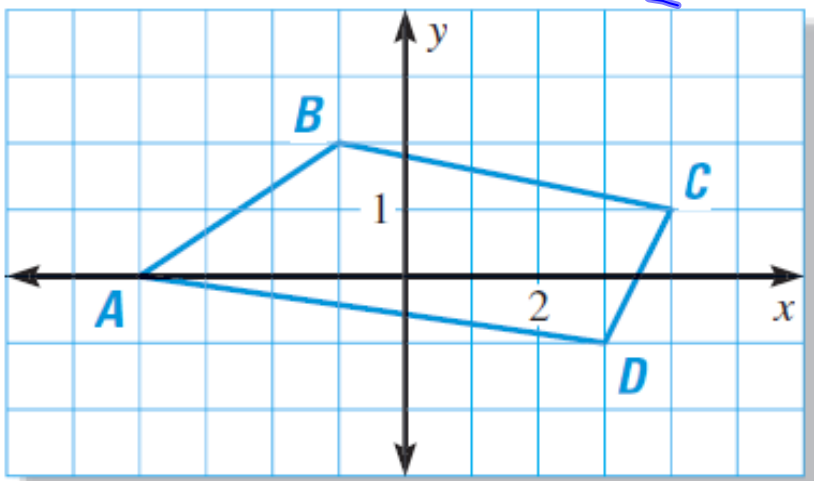
Ex. 2 Write a matrix to represent

a. Point A

$$\begin{matrix} x \\ y \end{matrix}\begin{bmatrix} -4 \\ 0 \end{bmatrix}$$

b. Quadrilateral $ABCD$

$$\begin{matrix} & A & B & C & D \\ x & -4 & -1 & 4 & 3 \\ y & 0 & 2 & 1 & -1 \end{matrix}$$



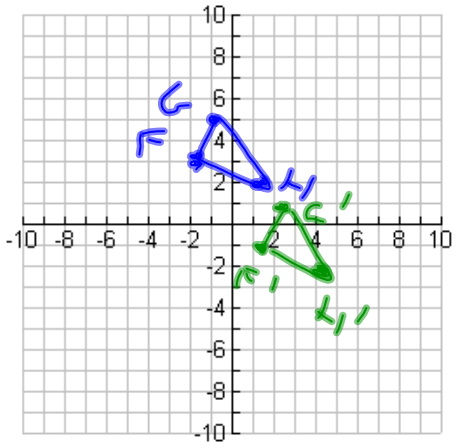
Matrices can be added or subtracted only if they have the same dimensions.

Ex 3 $\begin{bmatrix} 2 & 3 & 5 \\ 7 & -1 & 8 \end{bmatrix} - \begin{bmatrix} 12 & -2 & 1 \\ 6 & 3 & -4 \end{bmatrix} = \begin{bmatrix} -10 & 5 & 4 \\ 1 & -4 & 12 \end{bmatrix}$

Ex 4 $\begin{bmatrix} 7 & 2 \\ -5 & 9 \end{bmatrix} + \begin{bmatrix} -8 & 1 \\ 4 & 0 \end{bmatrix} = \begin{bmatrix} -1 & 3 \\ -1 & 9 \end{bmatrix}$

Matrices and Translations

Ex 5 $\begin{bmatrix} -2 & -1 & 1 \\ 3 & 5 & 2 \end{bmatrix}$ represents triangle FGH. Find the image matrix that represents a translation 3 units right and 4 units down.



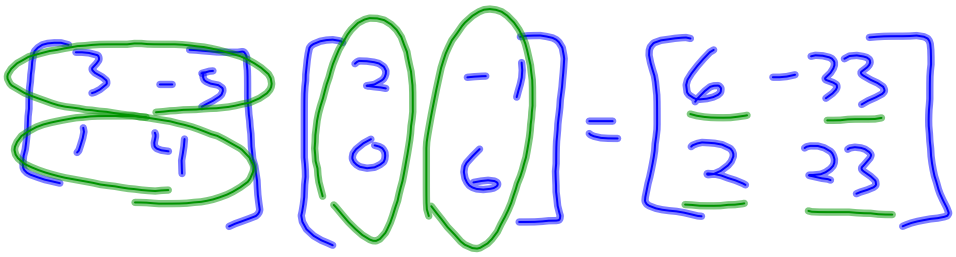
$\begin{bmatrix} -2 & -1 & 1 \\ 3 & 5 & 2 \end{bmatrix} + \begin{bmatrix} 3 & 3 & 3 \\ -4 & -4 & -4 \end{bmatrix}$

$\begin{matrix} F' & G' & H' \end{matrix}$

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

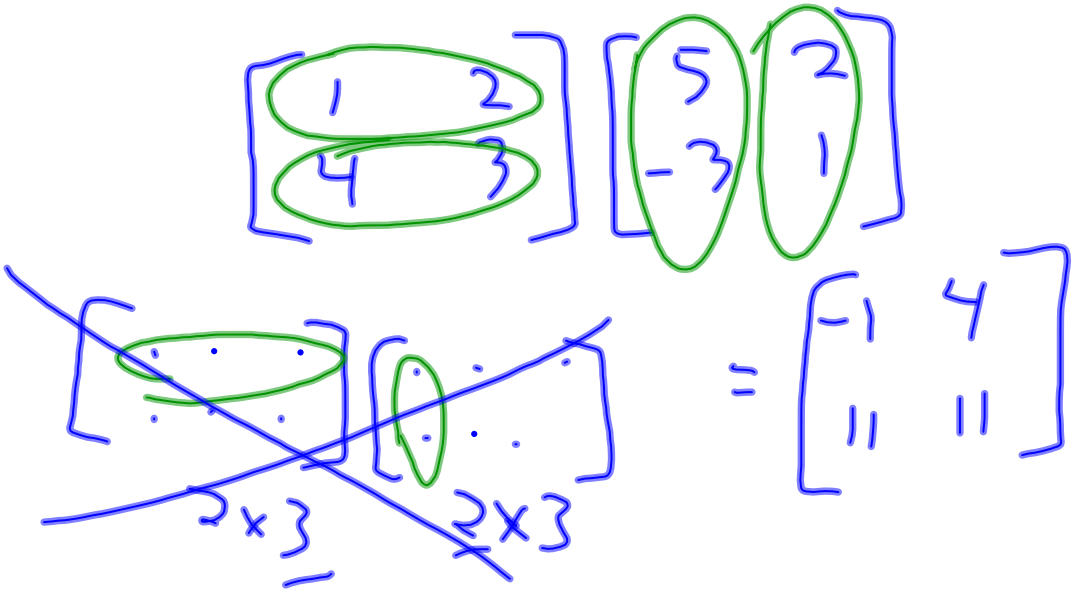
Ex 6 Find AB

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



Ex 7 Find CD

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



Ex 8 Find EF

$$E = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 2 \\ 3 & 3 & 1 \end{bmatrix} \quad F = \begin{bmatrix} 3 & 2 & 1 \\ 1 & 2 & 1 \\ 1 & 3 & 3 \end{bmatrix}$$

$$\begin{bmatrix} 8 & 15 & 12 \\ 9 & 12 & 9 \\ 13 & 15 & 9 \end{bmatrix}$$