4.13B Matrices as Functions

AP Precalculus

Name: ______________________________

CA #1

Directions: Matrix A and B represent the transformations T and U respectively. Find the associated matrix for the composition of the function and then find the vector after the given transformation.

1) Find the associated matrix and $T\left(U(\vec{v})\right)$.

$A = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}, B = \begin{bmatrix} 3 & 3 \\ 2 & 2 \end{bmatrix}, \vec{v} = \langle -3,2 \rangle$

2) Find the associated matrix and $U\left(T(\vec{v})\right)$.

$A = \begin{bmatrix} -1 & 4 \\ 0 & -3 \end{bmatrix}, B = \begin{bmatrix} 2 & 1 \\ -1 & 3 \end{bmatrix}, \vec{v} = \langle 3,6 \rangle$

3) Find the associated matrix and $U\left(T(\vec{v})\right)$.

$A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}, B = \begin{bmatrix} -1 & 1 \\ 3 & 0 \end{bmatrix}, \vec{v} = \langle 6,-5 \rangle$

4) Find the associated matrix and $U\left(T(\vec{v})\right)$.

$A = \begin{bmatrix} -1 & -1 \\ 1 & 1 \end{bmatrix}, B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}, \vec{v} = \langle -5,-2 \rangle$

Directions: Find the associated matrix to the composition of transformations.

5) Rotation of $\frac{\pi}{2}$ radians counterclockwise and reflected in both x- and y-axes.

6) Horizontal and vertical dilation of 4, and a rotation of $\frac{3\pi}{2}$ radians counterclockwise.

Directions: Given $\vec{v}$ find the vector $\vec{u}$, that was transformed by matrix *A* to get $\vec{v}$.	
7) $\vec{v} = \langle 3,-9\rangle$ and *A* = $\begin{bmatrix} 3 & 6 \\ 2 & 3 \end{bmatrix}$.	8) $\vec{v} = \langle -6,4\rangle$ and *A* = $\begin{bmatrix} 8 & -6 \\ 3 & -2 \end{bmatrix}$.

ANSWERS

1) $\begin{bmatrix} 8 & 8 \\ 7 & 7 \end{bmatrix}, \langle -8,-7\rangle$
2) $\begin{bmatrix} -2 & 5 \\ 1 & -13 \end{bmatrix}, \langle 24,-75\rangle$
3) $\begin{bmatrix} 1 & -2 \\ 6 & 24 \end{bmatrix}, \langle 16,-84\rangle$
4) $\begin{bmatrix} -1 & -1 \\ 1 & 1 \end{bmatrix}, \langle 7,-7\rangle$
5) $\begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$
6) $\begin{bmatrix} 0 & 4 \\ -4 & 0 \end{bmatrix}$
7) $\langle -21,11\rangle$
8) $\langle 18,25\rangle$