Matrix addition How do you add matrices?

Scalar multiplication How do you multiply a matrix by a number?

Transpose What is the transpose of a matrix?

Matrix multiplication

We know how to change $\vec{x}$ to $B\vec{x}$: we just get a new vector $\vec{y}$. We could also do $A\vec{y}$ to get a new vector $\vec{z}$. Do this for $A = \begin{bmatrix} 10 & 100 & 1000 \\ 20 & 200 & 2000 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 3 & 4 \\ 5 & 6 \end{bmatrix}$ and $\vec{x} = \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$.

(a) $\vec{y} = \begin{bmatrix} & \\ & \\ & \end{bmatrix}$

(b) $\vec{z} = \begin{bmatrix} & \\ & \end{bmatrix}$

(c) Give a single matrix C so that $\vec{z} = C\vec{x}$. That is, $A(B\vec{x}) = C\vec{x}$. We call this matrix $C = AB$.

$C = \begin{bmatrix} & \\ & \end{bmatrix}$

1.8.1 (HW1.8#13) If $A = \begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$ describe geometrically what $T(\vec{x}) = A\vec{x}$ does to $\vec{x}$?

1.8.2 (HW1.8#19) If $T : \mathbb{R}^2 \to \mathbb{R}^2$ is a linear transformation with $T(\vec{e}_1) = (2, 5)$ and $T(\vec{e}_2) = (-1, 6)$, then calculate $T(5, -3)$.

1.9.1 (HW1.9#1) If $T : \mathbb{R}^2 \to \mathbb{R}^4$ is a linear transformation with $T(\vec{e}_1) = (3, 1, 3, 1)$ and $T(\vec{e}_2) = (-5, 2, 0, 0)$ then what is the standard matrix of T?

2.1.1 If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 10 & 20 \\ 100 & 200 \\ 1000 & 2000 \end{bmatrix}$ then

(a) what is $A + B$?

(b) what is $A + B^T$?

(c) what is AB?