CSPC 314 Worksheet 1 September 5, 2014

Name: _____
Student #: _____

(1) Compute the following, where: $M = \begin{bmatrix} 2 & 5 & 1 \\ 1 & 3 & 0 \\ 0 & -2 & -1 \end{bmatrix}$ $a = \begin{bmatrix} 0 \\ 3 \\ 1 \end{bmatrix}$ $b = \begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}$

(a) Ma $\begin{bmatrix} 16 \\ 9 \\ -7 \end{bmatrix}$

(b) $(M \cdot M)a$ $\begin{bmatrix} 70 \\ 43 \\ -11 \end{bmatrix}$

(c) $a^T M^T$ $(Ma)^T = a^T M^T = [16 \ 9 \ -7]$

(d) $a^T b$ $[\ \ ][\ ] = 9$

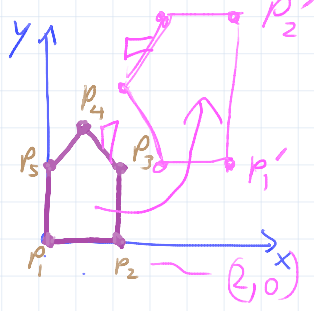
(e) $a \cdot b$ $= 9$

(f) ab $[\ ][\ ]$ nonsense

(2) Transform the vertices of the following object (a house) using

$$\begin{bmatrix} x' \\ y' \\ 1 \end{bmatrix} = \begin{bmatrix} 0 & -1 & 5 \\ 2 & 0 & 2 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} x \\ y \\ 1 \end{bmatrix}$$

and then draw the transformed object.



1 grid cell = 1 unit

$p_1' = (5, 2)$

$p_2' = (5, 6)$

(3) Give three ways in which one might "multiply" two vectors, $a \in \mathbb{R}^3$, $b \in \mathbb{R}^3$ e.g., $a = \begin{bmatrix} 1 \\ 2 \\ 4 \end{bmatrix}$, $b = \begin{bmatrix} -2 \\ 1 \\ 3 \end{bmatrix}$

$a \cdot b$ scalar
$a \times b$ vector
$a \cdot b^T$ matrix
$b \cdot a^T$