Worksheet - Lecture 1
Introduction to Linear Algebra Part One

1. Use the following matrices or vectors to answer the following questions:

$$A = \begin{pmatrix} 1 & 3 & 8 \\ 3 & 0 & -2 \\ 4 & 1 & -3 \end{pmatrix} \quad M = \begin{pmatrix} 1 & 8 & -2 & 5 \\ 2 & 8 & 1 & 7 \end{pmatrix} \quad D = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 5 & 0 \\ 0 & 0 & 3 \end{pmatrix}$$

$$X = \begin{pmatrix} 780 & 95000 \\ 600 & 60000 \\ 550 & 65000 \\ 400 & 35000 \\ 450 & 40000 \\ 750 & 80000 \end{pmatrix} \quad t = \begin{pmatrix} 1 \\ 1.3 \\ 0.8 \\ 2 \\ 2.5 \\ 0.8 \\ 0.9 \end{pmatrix} \quad v = \begin{pmatrix} 6 \\ 3 \\ -1 \\ 2 \end{pmatrix} \quad u = (6 \ 4 \ 8 \ 1)$$

a. Write the appropriate size/dimensions next to each matrix:

A __3x3__   X __6x2__   u __1x4__

M __2x4__   t __7x1__

D __3x3__   v __4x1__

b. Which of these matrices are square? Which are rectangular?

A, D   all others

c. Give the following quantities:

$A_{12} = 3$ $M_{2\star} = (2 \ 8 \ 1 \ 7)$ $v_3 = -1$

$M_{21} = 2$ $X_{42} = 35000$

$D_{\star 3} = \begin{pmatrix} 0 \\ 0 \\ 3 \end{pmatrix}$ $t_5 = 2.5$

c. What are the diagonal elements of A?

$A_{11} = 1$ $A_{22} = 0$ $A_{33} = -3$

2. For the following quantities, use what you know about notation to tell if they are matrices, vectors, or scalars:

H __Matrix__ v_2 __vector__ λ __scalar__

W __matrix__ v_2 __scalar__ A_{ij} __scalar__

n __scalar__ $M_{\star 2}$ __vector__   r __vector__