Math 251 X02 Assignment 1

Covers: Sections 1.1-1.4
Due: Thurs Sept 18 at 11:30am

INSTRUCTIONS:
This assignment will be marked for completion.
Solutions will be posted on the course website 24 hours after the deadline.
You may not copy the work of another person or AI.
Submit jpg or pdf files to the D2L Dropbox.

1. Write $\mathbf{w} = [-4, 1]$ as a linear combination of $\mathbf{u} = [1, -1]$ and $\mathbf{v} = [0, 0.5]$ by graphing.

2. Let $\mathbf{u} = [-12, -38, 122]$ and $\mathbf{v} = [1, -2, 7]$. Find $\mathbf{a}$ and $\mathbf{b}$ such that: $\mathbf{a} + \mathbf{b} = \mathbf{u}$, $\mathbf{a}$ is parallel to $\mathbf{v}$, and $\mathbf{b}$ is orthogonal to $\mathbf{v}$.

3. Find the distance between $A = (11, 13, -2)$ and $\mathbf{x} = \begin{bmatrix} 4 \\ 6 \\ 8 \end{bmatrix} + t \begin{bmatrix} 1 \\ 2 \\ -2 \end{bmatrix}$.

4. Find a normal form for the plane through $A = (6, 5, -3)$, $B = (3, 2, 0)$ and $C = (9, 6, -3)$.

5. Find the volume of the parallelepiped determined by $\mathbf{a} = [2, -3, 7]$, $\mathbf{b} = [-4, 5, 4]$ and $\mathbf{c} = [1, -1, -1]$.