TAM 210/211 - Written Assignment 1 (due January 29)

Objective: Perform vector calculations, such as summation, dot and cross product using Matlab.

Instructions:

• Complete the calculations given below.

• You may write your answers on this document for this Written Assignment ONLY (note that future assignments will require a separate page following engineering format).

• You MUST attach a printout of Matlab code supporting your calculations and answers. Make sure that your Matlab code has clearly defined variables and solutions. e.g. In question 1, define A, B, and C in your code.

• Commenting your code is highly encouraged.

• Assignments without Matlab code included will receive a zero.

1) For vectors $\mathbf{A} = 9\mathbf{i} - 5\mathbf{j}$ and $\mathbf{B} = -2\mathbf{i} + 4\mathbf{j}$, determine:
   a) an expression for the resultant vector $\mathbf{C} = \mathbf{A} + \mathbf{B}$.
   b) the magnitude and direction of the resultant vector $\mathbf{C}$.
   Make a graphical representation of your results.

2) For vectors $\mathbf{A} = -5\mathbf{i} + 1\mathbf{j} - 8\mathbf{k}$ and $\mathbf{B} = 6\mathbf{i} - 3\mathbf{j} + 4\mathbf{k}$, what is the dot (scalar) product $\mathbf{A} \cdot \mathbf{B}$?
3) For vectors $\mathbf{A} = -5\mathbf{i} + 1\mathbf{j} - 8\mathbf{k}$ and $\mathbf{B} = 6\mathbf{i} - 3\mathbf{j} + 4\mathbf{k}$, what is the cross (vector) product $\mathbf{A} \times \mathbf{B}$?

4) What is the unit vector that points along $\mathbf{A} = -1\mathbf{i} - 8\mathbf{j}$?

5) For vectors $\mathbf{A} = -6\mathbf{i} + 3\mathbf{j}$ and $\mathbf{B} = 4\mathbf{i} - 7\mathbf{j}$, what is the cosine of the angle between $\mathbf{A}$ and $\mathbf{B}$?
6) For vectors $\mathbf{A} = -1\mathbf{i} + 6\mathbf{j}$ and $\mathbf{B} = 4\mathbf{i} - 4\mathbf{j}$, what is the projection of $\mathbf{A}$ onto $\mathbf{B}$?

7) For vectors $\mathbf{A} = 6\mathbf{i} - 6\mathbf{j} - 4\mathbf{k}$ and $\mathbf{B} = -2\mathbf{i} + 3\mathbf{j} - 6\mathbf{k}$, what is the cross (vector) product $\mathbf{B} \times \mathbf{A}$?