1.8 and 1.9 Handwrite Practice

Handwrite your responses to 1. and 2. below and collate into a single PDF for submission into ASULearn.

1. a) Use a rectangular coordinate system to sketch the following four vectors and label their coordinates, all on one plot:

   i) $\begin{bmatrix} 4 \\ 2 \end{bmatrix}$

   ii) $\begin{bmatrix} -2 \\ 4 \end{bmatrix}$

   iii) $\begin{bmatrix} .5 & .5 \\ .5 & .5 \end{bmatrix} \begin{bmatrix} 4 \\ 2 \end{bmatrix}$

   iv) $\begin{bmatrix} .5 & .5 \\ .5 & .5 \end{bmatrix} \begin{bmatrix} -2 \\ 4 \end{bmatrix}$

  b) What kind of linear transformation is $\begin{bmatrix} .5 & .5 \\ .5 & .5 \end{bmatrix}$ (dilation, projection, reflection, rotation, shear, other)?

  c) What is the span of the columns of $\begin{bmatrix} .5 & .5 \\ .5 & .5 \end{bmatrix}$?

  d) What is the determinant of $\begin{bmatrix} .5 & .5 \\ .5 & .5 \end{bmatrix}$?

2. True/False: A linear transformation $T : \mathbb{R}^n \to \mathbb{R}^n$ is completely determined by its effect on the columns of the $n \times n$ identity matrix

  a) Handwrite the statement.

  b) Identify the statement as true or false.

  c) If this statement is false, provide a specific counterexample or reason. If it is true, quote a phrase and page number from our book in support of the statement.