Math 251
Assignment 3

Deadline: Wed March 24, 2:30pm Pacific Time
Submit on D2L

Number of Questions: 4
Total Marks: 10 marks

Show all your work for full marks.
You MAY use the course website (notes, videos etc) and your own notes
You may NOT copy from others (classmates, tutors, Chegg etc)

Submit jpg or pdf files
Feel free to handwrite your solutions and take photos of your work

Covers Sections 3.5-4.4

1. [2 marks] Find a basis for the span below. Use any method and show all your work for full marks.

$$\text{span}\left(\begin{bmatrix}1\\1\\2\\4\end{bmatrix}, \begin{bmatrix}3\\3\\7\\5\end{bmatrix}, \begin{bmatrix}3\\3\\8\\-2\end{bmatrix}, \begin{bmatrix}11\\11\\27\\9\end{bmatrix}\right)$$

2. [2 marks] Let T be a linear transformation such that $T\left(\begin{bmatrix}1\\6\end{bmatrix}\right) = \begin{bmatrix}2\\1\\-2\end{bmatrix}$ and $T\left(\begin{bmatrix}2\\-3\end{bmatrix}\right) = \begin{bmatrix}1\\-6\\1\end{bmatrix}$. Find $T\left(\begin{bmatrix}83\\-432\end{bmatrix}\right)$.

3. [2 marks] Find all the eigenvalues of $\begin{bmatrix}30 & -11\\7 & 48\end{bmatrix}$.

4. [4 marks] The matrix $A = \begin{bmatrix}2 & -2 & 1\\-1 & 3 & -1\\2 & -4 & 3\end{bmatrix}$ has eigenvalues 1 and 6.

Find a matrix P that diagonalizes A .