

Homework 9 MATH 304 Section 3

Assigned: Friday, October 10.

Potentially Collected: Friday, October 17.

1. Are the following subspaces of their respective vector spaces?

(i) H consists of all vectors $\begin{bmatrix} s \\ 3s \\ 2s \end{bmatrix}$ in \mathbb{R}^3 .

(ii) W consists of all vectors $\begin{bmatrix} s + 3t \\ s - t \\ 2s - t \\ 4t \end{bmatrix}$ in \mathbb{R}^4 .

(iii) T is the set of all vectors $\begin{bmatrix} x \\ y \end{bmatrix}$ where $x^2 + y^2 \leq 1$ in \mathbb{R}^2 .

2. Let $\vec{v}_1 = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$, $\vec{v}_2 = \begin{bmatrix} 2 \\ 1 \\ 3 \end{bmatrix}$, $\vec{v}_3 = \begin{bmatrix} 4 \\ 2 \\ 6 \end{bmatrix}$, and $\vec{w} = \begin{bmatrix} 3 \\ 1 \\ 2 \end{bmatrix}$.

(i) Is \vec{w} in $\text{Span}\{\vec{v}_1, \vec{v}_2, \vec{v}_3\}$?

(ii) If yes, then what are the coefficients for \vec{w} in the linear combination of $\{\vec{v}_1, \vec{v}_2, \vec{v}_3\}$?