

# Homework 10 MATH 304 Section 3

**Assigned:** Monday, October 13.  
**Potentially Collected:** Monday, October 20.

1. Which of the following vectors in  $\mathbb{R}^3$  are linearly dependent? For those which are, express one vector as a linear combination of the rest.

(i)  $\left\{ \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 2 \\ 3 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, \begin{bmatrix} 3 \\ 6 \\ 6 \end{bmatrix} \right\}$ .

(ii)  $\left\{ \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 3 \\ 4 \\ 2 \end{bmatrix} \right\}$ .

(iii)  $\left\{ \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 3 \\ 4 \\ 2 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix} \right\}$ .

2. For what values of  $c$  are the vectors  $\vec{v}_1 = \begin{bmatrix} -1 \\ 0 \\ -1 \end{bmatrix}$ ,  $\vec{v}_2 = \begin{bmatrix} 2 \\ 1 \\ 2 \end{bmatrix}$ , and  $\vec{v}_3 = \begin{bmatrix} 1 \\ 1 \\ c \end{bmatrix}$  linearly dependent?

3. For what values of  $c$  are the vectors  $x + 3$  and  $2x + (c^2 + 2)$  in  $P_1$ , the vector space of degree 1 polynomials, linearly independent?