

## WEEK 3

## Section 2.6

1. Check whether the following vectors are linearly dependent or independent:
  - (a)  $[1, 2]$ ,  $[-5, 3]$
  - (b)  $[1, 2]$ ,  $[-5, 3]$ ,  $[6, 1]$
  - (c)  $[2, -1 - 1]$ ,  $[3, -4, -2]$ ,  $[5, -10, -8]$
  - (d)  $[2, -1, -1, 4]$ ,  $[1, 2, 3, 4]$
2. In each case above, determine the dimension of the span.
3. There is exactly one value of  $c$  such that the vectors  $[1, 0, 0, 1]$ ,  $[0, 1, -1, 0]$ ,  $[-1, 0, -1, 0]$  and  $[1, 1, 1, c]$  are linearly *dependent*. Find this value of  $c$ . Determine a non-trivial linear combination of these vectors that equals the zero vector.

## Section 3.1

4. Solve the linear system

(a)

$$\begin{aligned}2x + y &= 1 \\ y + 2z &= 2 \\ x + y + z &= 5\end{aligned}$$

(b)

$$\begin{aligned}5x + 2y + 2z &= 13 \\ 6x - 4y + 5z &= 31 \\ x + y + z &= 2\end{aligned}$$