1 Skryf 'n basis neer vir die volgende vektor-ruimte (Daar is dalk meer spasies as die nodige.):

Write down a basis for the following vector space. (There may be more space given than necessary.):

$$\{\mathbf{a} \in \mathbb{R}^5 | a_2 = a_3, a_1 + 3a_4 = a_5\}$$



$a_2 = a_3, \quad a_5 = a_1 + 3a_4$

$$\mathbf{a} = \begin{bmatrix} a_1 \\ a_3 \\ a_3 \\ a_4 \\ a_1+3a_4 \end{bmatrix} = a_1 \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix} + a_3 \begin{bmatrix} 0 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix} + a_4 \begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 3 \end{bmatrix}$$

$$\text{basis} = \left\{ \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 3 \end{bmatrix}, \dots \right\}$$

2 Skryf die draer-ruimte neer sowel as die dimensie van die ruimte onderspan deur die gegewe versamelings.

Write down the host space as well as the dimension of the spaces spanned by the given sets:

(a) A word onderspan deur
A is spanned by
$$\left\{ \begin{bmatrix} 1 \\ -10 \\ 100 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 1 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 6 \\ 0 \end{bmatrix} \right\}.$$

$\mathbb{R}^4$ ✓ ✓

A lê in $\mathbb{R}^n$ en het dimensie $d$.
A lies in $\mathbb{R}^n$ and has dimension $d$.

$n = \boxed{4}, \quad d = \boxed{3}$

(b) B word onderspan deur
B is spanned by
$$\left\{ \begin{bmatrix} 0 \\ 0 \\ 1 \\ 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 0 \\ 1 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 0 \\ 0 \\ 1 \\ 2 \\ 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} \right\}.$$

$\mathbb{R}^6$ ✓ ✓

B lê in $\mathbb{R}^m$ en het dimensie $e$.
B lies in $\mathbb{R}^m$ and has dimension $e$.

$m = \boxed{6}, \quad e = \boxed{3}$