Vector Spaces

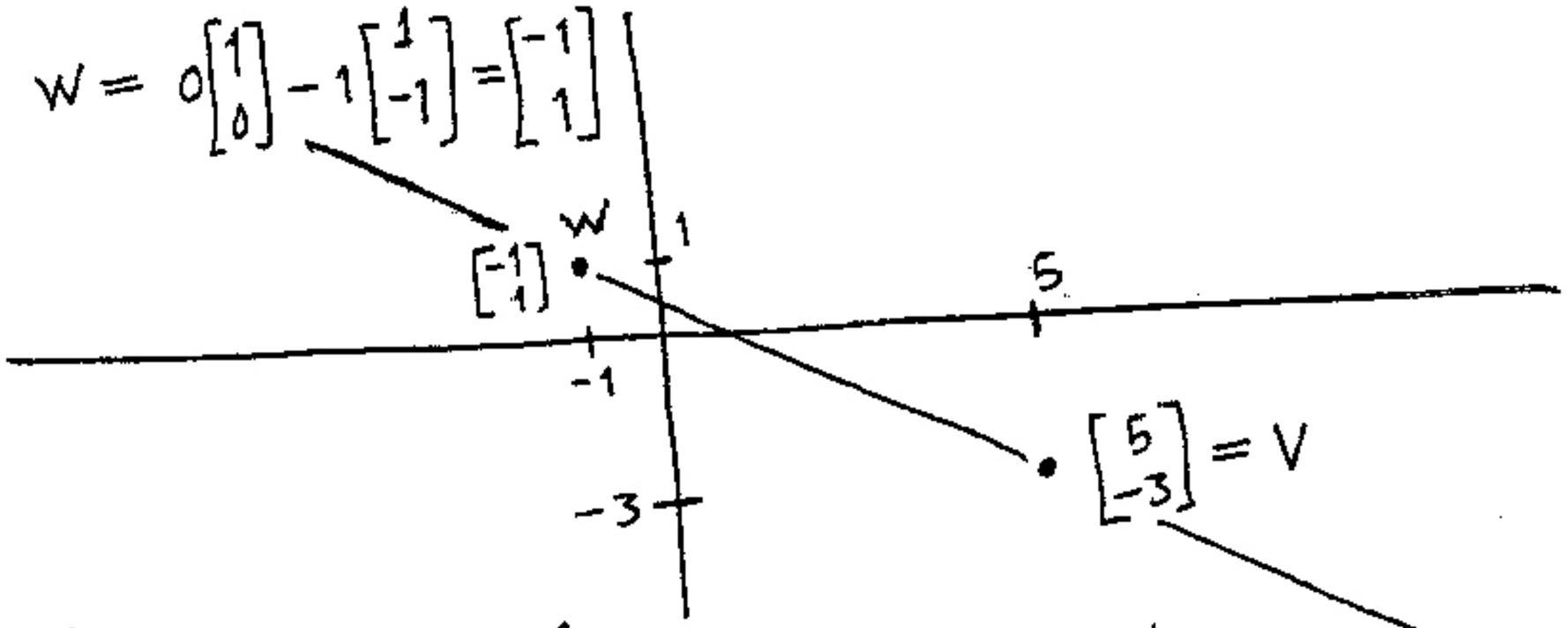
Section 2.3

M294 P III S P87 #9

(a) $B[v] = \begin{pmatrix} 2 \\ 3 \end{pmatrix}$ $\leftarrow v = 2\begin{bmatrix} 1 \\ 0 \end{bmatrix} + 3\begin{bmatrix} 1 \\ -1 \end{bmatrix} = \begin{bmatrix} 5 \\ -3 \end{bmatrix} = c_1\begin{bmatrix} 1 \\ 1 \end{bmatrix} + c_2\begin{bmatrix} 0 \\ 1 \end{bmatrix}$

$\begin{cases} c_1 = 5 \\ c_1 + c_2 = -3 \end{cases}$, $c_2 = -8$ and $B'[v] = \begin{pmatrix} 5 \\ -8 \end{pmatrix}$

(b) $w = 0\begin{bmatrix} 1 \\ 0 \end{bmatrix} - 1\begin{bmatrix} 1 \\ -1 \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$



(c) NO. Because the line does not pass through the origin. (Doesn't include 0 vector.)

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#33.

$$\begin{bmatrix} x & x & x & x \\ x & x & x & x \\ x & x & x & x \\ x & x & x & x \\ x & x & x & x \end{bmatrix} \begin{bmatrix} x \\ x \\ x \\ x \end{bmatrix} = \begin{bmatrix} x \\ x \\ x \\ x \\ x \end{bmatrix}$$

TRUE, FOR $\underline{x} \to A\underline{x}$ TO MAP $\mathbb{R}^4$ onto $\mathbb{R}^5$, THE COLUMNS OF A HAVE TO SPAN $\mathbb{R}^5$. THIS IS NOT POSSIBLE BECAUSE 4 VECTORS CANNOT SPAN $\mathbb{R}^5$.