

- 1) [1.7 Q13] Find the value(s) of h for which the vectors are linearly *dependent*.

$$\begin{bmatrix} 1 \\ 5 \\ -3 \end{bmatrix}, \begin{bmatrix} -2 \\ -9 \\ 6 \end{bmatrix}, \begin{bmatrix} 3 \\ h \\ -9 \end{bmatrix}$$

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- 2) [1.8 Q39] Let $T : \mathbb{R}^n \rightarrow \mathbb{R}^m$ be a linear transformation, and let $\{v_1, v_2, v_3\}$ be a linearly dependent set in \mathbb{R}^n . Explain why the set $\{T(v_1), T(v_2), T(v_3)\}$ is linearly dependent.

3) [1.9 Q6,8] Assume that T is a linear transformation. Find the standard matrix of T , where
(1) $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ is a horizontal shear transformation that leaves e_1 unchanged and maps e_2 into $e_1 + 3e_2$, **(2)** $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ first reflects points through the horizontal x_1 -axis and then reflects points through the line $x_2 = x_1$.

4) [1.8 Q41] Show that the transformation T defined by $T(x_1, x_2) = (2x_1 - 3x_2, x_1 + 4, 5x_2)$ is not linear.