

16. According to the statement found on page 67, a set of two vectors  $\{\vec{v}_1, \vec{v}_2\}$  is linearly dependent if at least one of the vectors is a multiple of the other.

$$\vec{v}_1 = \begin{bmatrix} 4 \\ -2 \\ 6 \end{bmatrix}, \quad \vec{v}_2 = \begin{bmatrix} 6 \\ -3 \\ 9 \end{bmatrix}$$

Because  $\vec{v}_1$  is  $\frac{2}{3}$  of  $\vec{v}_2$ , these two vectors are multiples of each other, and therefore,  $\{\vec{v}_1, \vec{v}_2\}$  are found to be linearly dependent.

18. According to Theorem # 8 on page 69, if a set contains more vectors than there are entries in each vector, then the set is linearly dependent.

$$\begin{bmatrix} 4 \\ 4 \end{bmatrix}, \begin{bmatrix} -1 \\ 3 \end{bmatrix}, \begin{bmatrix} 2 \\ 5 \end{bmatrix}, \begin{bmatrix} 8 \\ 1 \end{bmatrix}$$

Because there are more vectors than entries in

the vectors themselves, these four vectors are linearly dependent.