Name: _____

Section: _____

1. Which of the following sets of vectors in $\mathbb{R}^3$ contain two linearly independent vectors but no more? (Note that, geometrically, this is the same as spanning a plane).

$$\left\{\begin{pmatrix}1\\2\\0\end{pmatrix},\begin{pmatrix}-3\\-6\\0\end{pmatrix}\right\},\quad \left\{\begin{pmatrix}1\\2\\0\end{pmatrix},\begin{pmatrix}1\\0\\1\end{pmatrix}\right\},\quad \left\{\begin{pmatrix}1\\2\\0\end{pmatrix},\begin{pmatrix}1\\0\\1\end{pmatrix},\begin{pmatrix}0\\2\\-1\end{pmatrix}\right\}.$$

2. Does $\begin{pmatrix}5\\1\\5\end{pmatrix}$ lie in the span of $\begin{pmatrix}2\\1\\3\end{pmatrix}$ and $\begin{pmatrix}1\\-1\\-1\end{pmatrix}$? Deduce whether or not $\begin{cases}2x_1+x_2=5\\x_1-x_2=1\\3x_1-x_2=5\end{cases}$ has a solution.