1.3.24: True or False (and short reason)

1. When $\mathbf{u}, \mathbf{v}$ are non-zero vectors, $\mathrm{Span}(\mathbf{u}, \mathbf{v})$ contains only the line through $\mathbf{u}$ and the origin, and the line through $\mathbf{v}$ and the origin.
2. Any list of 5 real numbers is a vector in $\mathbb{R}^5$.
3. Asking whether the linear system corresponding to an augmented matrix $[\mathbf{a}_1\ \mathbf{a}_2\ \mathbf{a}_3 \mid \mathbf{b}]$ has a solution amounts to asking whether $\mathbf{b}$ is in the $\mathrm{Span}(\mathbf{a}_1, \mathbf{a}_2, \mathbf{a}_3)$.
4. The vector v results when a vector $\mathbf{u} - \mathbf{v}$ is added to $\mathbf{v}$.
5. The weights $c_1, \ldots, c_p$ in a linear combination $c_1\mathbf{v}_1 + \cdots + c_p\mathbf{v}_p$ cannot all be zero.

1.4.24: True or False (and short reason)

1. Every matrix equation $A\mathbf{x} = \mathbf{b}$ corresponds to a vector equation with the same solution set.
2. If the equation $A\mathbf{x} = \mathbf{b}$ is consistent, then $\mathbf{b}$ is in the set spanned by the columns of A.
3. Any linear combination of vectors can always be written in the form $A\mathbf{x}$ for a suitable matrix A and vector $\mathbf{b}$.
4. If the coefficient matrix A has a pivot position in every row, then the equation $A\mathbf{x} = \mathbf{b}$ is inconsistent.
5. If the columns of an $m \times n$ matrix span $\mathbb{R}^m$, then the equation $A\mathbf{x} = \mathbf{b}$ is consistent for every $\mathbf{b} \in \mathbb{R}^m$.