linear combinations

Geometrically,

the linear span

linear combinations

We say that $\vec{v}$ is a linear combination of $\vec{v_1}, \vec{v_2}, \ldots, \vec{v_n}$, if there exist scalars $x_1, x_2, \ldots, x_n$ such that $\vec{v} = x_1\vec{v_1} + x_2\vec{v_2} + \ldots + x_n\vec{v_n}$.

- A linear combination means we add (or subtract) scalar multiples of vectors to get a new vector
- Because of the rules of vector addition, any such linear combination will be in the vector space
- Geometrically, the linear combinations of a nonzero vector form a line. The linear combinations of two nonzero vectors form a plane, unless the two vectors are collinear, in which case they form a line.

The set of all linear combinations of vectors $\vec{v_1}, \vec{v_2}, \ldots, \vec{v_n}$ is denoted by $span(\vec{v_1}, \vec{v_2}, \ldots, \vec{v_n})$ and called the linear span of these vectors.

linear combinations: planes and lines