



## VECTOR SPACE DIMENSIONS

### Why

The number of vectors in any basis is the same.

### Defining Result

A vector space is *finite-dimensional* if it has a finite basis; otherwise it is *infinite-dimensional*.

**PROPOSITION 1.** *Every basis of a finitely spanned vector space has the same number of elements.*

The *dimension* of a finite-dimensional vector space is the number of distinct vectors in any basis. If a vector space is finite-dimensional and every basis has  $n$  distinct elements we call it a  *$n$ -dimensional vector space*.

