

Basis & Dimension

Mathematics

How independence, spanning and dimension constrain each other.

V has dimension n . Every basis of V has exactly n vectors.

Set of vectors	Independent	Spans V
A basis of V	Yes	Yes
A spanning set	Not required	Yes
An independent set	Yes	Not required
Fewer than n vectors	Possible	Never
More than n vectors	Never	Possible

Any n independent vectors in an n -dimensional space are automatically a basis, and so is any n vectors that span it.