

I would say “so far, most of the math you’ve learned is about  $\mathbb{R}^n$ . As you probably understand, the axioms that define an abstract vector space apply to  $\mathbb{R}^n$ . Now we want to understand what other mathematical objects satisfy those same axioms. For instance, the collection of all polynomials with real coefficients and degree less than or equal to  $n$  also satisfies those same axioms, and therefore there are ways in which studying these polynomials is the same as studying  $\mathbb{R}^n$ .

Now you might ask in what ways are they similar? Well, that’s also the goal of studying abstract vector spaces—what are the properties of  $\mathbb{R}^n$  that rely only on the axiomatic properties of being a vector space? For instance, one such property is having a collection of vectors (basis vectors) such that any element of  $\mathbb{R}^n$  can be written as a linear combination of the vectors in this collection. Since that property of  $\mathbb{R}^n$  only relies on the axiomatic properties of being a vector space, any other abstract vector space (such as the collection of all polynomials with real coefficients and degree less than or equal to  $n$ ) must have that same property, and in that way is similar to  $\mathbb{R}^n$ .”