= 1 is the above @-@ mentioned simplest example , in which the field F is also regarded as a vector space over itself . The case F =
R and n = 2 was discussed in the introduction above .

= = = Complex numbers and other field extensions = = =

The set of complex numbers C , i.e. , numbers that can be written in the form x + iy for real numbers x and y where i is the imaginary unit , form a vector space over the reals with the usual addition and multiplication : (x + iy) + (a + ib)
= (x + a) + i (y + b) and c ? (x + iy) =
(c ? x) + i (c ? y) for real numbers x , y , a , b and c . The various axioms of a vector space follow from the fact that the same rules hold for complex number arithmetic .
In fact , the example of complex numbers is essentially the same (i.e. , it is isomorphic) to the vector space of ordered pairs of real numbers mentioned above : if we think of the complex number x + i y as representing the ordered pair (x , y) in the complex plane then we see that the rules for sum and scalar product correspond exactly to those in the earlier example .
More generally , field extensions provide another class of examples of vector spaces , particularly in algebra and algebraic number theory : a field F containing a smaller field E is an E @-@ vector space , by the given multiplication and addition operations of F. For example , the complex numbers are a vector space over R , and the field extension <formula> is a vector space over Q.

= = = Function spaces = = =

Functions from any fixed set ? to a field F also form vector spaces , by performing addition and scalar multiplication pointwise . That is , the sum of two functions f and g is the function (f + g) given by