

Answer to Question #90985 – Math – Linear Algebra

Question

R is a vector space over C with respect to the usual operation of addition and multiplication. true or false.

Solution

R is not a vector space over C with respect to the usual operations.

Why? Recall that, if R would be a vector space over C, this means that any pair (r,c) is closed under scalar multiplication, where r is from R and c is from C.

This means that $cr \in R$ for any complex c and any real vector r .

If we take, for instance, $c=i$ and $r=1$ (read vector r) $\Rightarrow cr = i$ and definitely i is not in R, since it is a complex number.

Therefore, it is not closed under multiplication $\Rightarrow R$ is not a vector space.

It does not even worth checking the rest of the axioms.

Answer: R is not a vector space over C with respect to the usual operations.