Question #22433 Let U and V be vector spaces over a field F,a function $T: U \to F$, such that $T(\alpha_1 u_1 + \alpha_2 u_2) = \alpha_1 T(u_1) + \alpha_2 T(u_2)$, for $\alpha_1, \alpha_2 \in F$ and $u_1, u_2 \in U$
is a called a ... if (A) Vector space
(B) Transformation
(C) Linear transformation
(D) Nullity
Please explain

Solution. By definition the property of function T: $T(\alpha_1 u_1 + \alpha_2 u_2) = \alpha_1 T(u_1) + \alpha_2 T(u_2)$, for $\alpha_1, \alpha_2 \in F$ and $u_1, u_2 \in U$ is **linearity property**. Vector space is not a function, as well as nullity, which is dimension of kernel of T. Transformation is synonym to "function", however this does not describe the property in question Hence
Answer C.