Morphisms

You have now seen many types of linear transformations. It is crucial that you know their main classifications. Try the following exercises to test yourself:

Define the following terms: (i) domain, (ii) codomain, (iii) image, (iv) injective, (v) surjective. (Be sure to include any common synonyms in your definition.)

Now fill in the following table with either vector spaces $V, W, \{0\}$ (in some cases $W = V$) or $\surd, \times, —$ (yes/no/undetermined):

$f : V \to W$	Domain	Codomain	Injective	Surjective	$\ker(f)$	$\mathrm{im}(f)$
homomorphism						
epimorphism						
monomorphism						
isomorphism						
endomorphism						
automorphism						

Give a non-trivial example of each the above six types of vector space morphisms: