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ring homomorphism

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Defines	ring isomorphism
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Let R and S be rings. A *ring homomorphism* is a function $f : R \longrightarrow S$ such that:

- $f(a + b) = f(a) + f(b)$ for all $a, b \in R$

- $f(a \cdot b) = f(a) \cdot f(b)$ for all $a, b \in R$

A *ring isomorphism* is a ring homomorphism which is a bijection. A *ring monomorphism* (respectively, *ring epimorphism*) is a ring homomorphism which is an injection (respectively, surjection).

When working in a context in which all rings have a multiplicative identity, one also requires that $f(1_R) = 1_S$. Ring homomorphisms which satisfy this property are called *unital* ring homomorphisms.