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division ring

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A *division ring* is a ring  $D$  with identity such that

- $1 \neq 0$
- For all nonzero  $a \in D$ , there exists  $b \in D$  with  $a \cdot b = b \cdot a = 1$

Every field is a commutative division ring. The Hamiltonian quaternions are an example of a division ring which is not a field.