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real ring

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A ring A is called real iff the following identity holds for all $n \in \mathbb{N}$:

$$a_1^2 + \cdots + a_n^2 = 0 \Leftrightarrow a_1, \ldots, a_n = 0 \qquad (\forall a_1, \ldots, a_n \in A)$$

Remark. If A is a ring then being real implies the following

- A can have a partial ordering

- A is reduced

Conversely, we note that if A is reduced and can have a partial ordering then A is a real ring. If A is a field then we call it a *real field.* Similarly we define *real domains, real (von Neumann) regular rings, . . .*