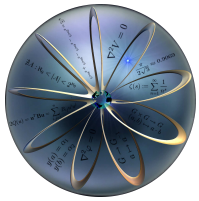

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## Euclidean field

| | |
|---|---|
| Canonical name | EuclideanField |
| Date of creation | 2013-03-22 14:22:39 |
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| Owner | CWoo (3771) |
| Last modified by | CWoo (3771) |
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| Entry type | Definition |
| Classification | msc 12D15 |
| Related topic | ConstructibleNumbers |
| Related topic | EuclideanNumberField |
| Defines | Euclidean |

An ordered field $F$ is *Euclidean* if every non-negative element $a$ ($a \geq 0$) is a square in $F$ (there exists $b \in F$ such that $b^2 = a$).

# 1 Examples

- $\mathbb{R}$ is Euclidean.
- $\mathbb{Q}$ is not Euclidean because 2 is not a square in $\mathbb{Q}$ (`http://planetmath.org/Iei`.e., $\pm\sqrt{2} \notin \mathbb{Q}$).
- $\mathbb{C}$ is not a Euclidean field because `http://planetmath.org/MathbbCIsNotAnOrderedField`$\mathbb{C}$ is not an ordered field.
- The `http://planetmath.org/ConstructibleNumbers`field of real constructible numbers is Euclidean.

A Euclidean field is an ordered Pythagorean field.
There are ordered fields that are Pythagorean but not Euclidean.