planetmath.org

Math for the people, by the people.

Klein 4-ring

Canonical name	Klein4ring
Date of creation	2015-06-04 16:11:18
Last modified on	2015-06-04 16:11:18
Owner	pahio (2872)
Last modified by	pahio (2872)
Numerical id	16
Author	pahio (2872)
Entry type	Definition
Classification	msc 20-00
Classification	msc 16B99
Synonym	Klein's four-ring
Synonym	Klein four-ring
Related topic	Klein4Group
Related topic	InversesInRings
Related topic	NonCommutativeRingsOfOrderFour
Related topic	GroupsInField
Related topic	Subcommutative

One of the two smallest non-commutative rings is the *Klein 4-ring* $(R, +, \cdot)$ where $(R, +)$ is the Klein 4-group $\{0, a, b, c\}$ with 0 the neutral element and the binary operation "$\cdot$" given by the table

$\cdot$	0	a	b	c
0	0	0	0	0
a	0	a	0	a
b	0	b	0	b
c	0	c	0	c

Note that this ring has two different right unities a and c.

The Klein 4-ring has the subrings $\{0, a\}$, $\{0, b\}$ and $\{0, c\}$ and the two-sided ideal $\{0, b\}$.