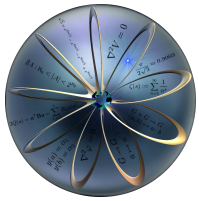

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non-commutative rings of order four

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Up to isomorphism, there are two non-commutative rings of `http://planetmath.org/OrderRin` four. Since all cyclic rings are `http://planetmath.org/CommutativeRing`commutative, one can immediately deduce that a ring of order four must have an additive group that is isomorphic to $\mathbb{F}_2 \oplus \mathbb{F}_2$.

One of the two non-commutative rings of order four is the Klein 4-ring, whose multiplication table is given by:

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

The other is closely related to the Klein 4-ring. In fact, it is anti-isomorphic to the Klein 4-ring; that is, its multiplication table is obtained by swapping the of the multiplication table for the Klein 4-ring:

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