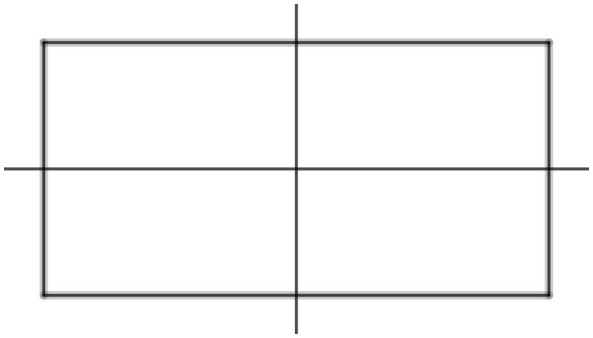
Symmetries of a Rectangle

If you take a rectangle and rotate it $180°$ about the centre then it looks exactly the same as it did before. We say the rectangle has rotation symmetry.



The symmetries of the rectangle are:

e do nothing

a rotate $180°$ about the centre

b rotate $180°$ about the x axis

c rotate $180°$ about the y axis

We can combine symmetries.

$a*b$ means you do b and then you do a This means you do b first.

Take a piece of card, in the shape of a rectangle.

If you do b and then do a it will end up in the same position as if you had just done c

Try it.

So $a*b$ is the same as c So $a*b=c$

Here is the combination table. You should check some of these.

*	e	a	b	c
e	e	a	b	c
a	a	e	c	b
b	b	c	e	a
c	c	b	a	e

Note: $a*b$ goes in the a row and the b column.

The set $\{e,a,b,c\}$ with the binary operation * forms a group.