

Symmetries of an Equilateral Triangle

\circ	I	R	R^2	F	FR	RF
I	I	R	R^2	F	FR	RF
R	R	R^2	I	RF	F	FR
R^2	R^2	I	R	FR	RF	F
F	F	FR	RF	I	R	R^2
FR	FR	RF	F	R^2	I	R
RF	RF	F	FR	R	R^2	I

NAME	Read As	Means	Effect
I	“I”	Identity	A A CB CB
R	“R”	Rotate 120° clockwise	A C CB BA
R^2	“R squared”	Rotate 240° clockwise	A B CB AC
F	“F”	Flip (vertical axis)	A A CB BC
FR	“F of R”	Rotate then flip	A C CB AB
RF	“R of F”	Flip then rotate	A B CB CA

Some Rules for Computations with Symmetries

Equality (=):

For all A, $A=A$ reflexivity
For all A,B If $A=B$ then $B=A$. symmetry
For all A,B,C If $A=B$ and $B=C$, then $A=C$. transitivity
(General principle of substitution)

Other Rules (work in progress):

For all A,B,C $A(BC)=(AB)C$ associativity
For all A $IA=AI=A$ identity

$$R^3=I$$

$$F^2=I$$

$$R^2F=FR$$

$$FR^2=RF$$

$$FRF=R^2$$

$$RFR=F$$

$$FRFR=I$$

$$RFRF=I$$