

Equilateral Triangle Symmetries

*	e	r	r ²	f	fr	fr ²
e	e	r	r ²	f	fr	fr ²
r	r	r ²	e	fr	fr ²	f
r ²	r ²	e	r	fr ²	f	fr
f	f	fr ²	fr	e	r ²	r
fr	fr	f	fr ²	r	e	r ²
fr ²	fr ²	fr	f	r ²	r	e

This is the table you were invited to construct on slide 7 of the slides from Episode 1.

The operation * means 'followed by'. Do left column first followed by the top row of inputs. And read the meaning of fr backwards (!), i. e. do r first, then f. So rf means 'do f first, then r'. So $rf = fr^2$ and $r^2f = fr$. That's why rf and r^2f don't appear separately in table. And it means $rf \neq fr$. (Check with the permutations shown on the 'construit' web page linked on slide 7.)

This group is called S_3 , it is the group of permutations on three symbols (six objects) or the symmetries of an equilateral triangle. Notice the *subgroup* of $\{e, r, r^2\}$ which forms a group of its own.