(4) Fill out the following multiplication table (you can either draw pictures; or flip and rotate a model triangle, or multiply permutations).

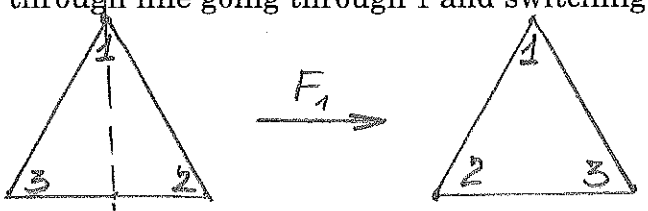
	I	F_1	F_2	F_3	$\circlearrowleft$	$\circlearrowright$
I						
F_1						
F_2						
F_3						
$\circlearrowleft$						
$\circlearrowright$						

(5) Write down as many interesting things about this multiplication table as you can.

-
-
-
-

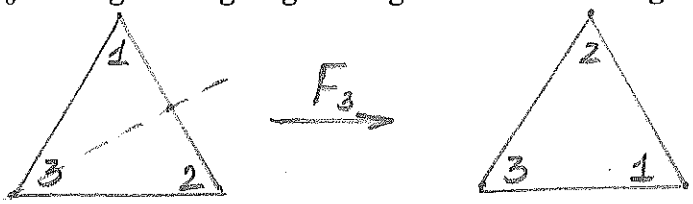
There are also three flips:

- The flip F_1 through line going through 1 and switching 2 and 3:



- The flip F_2 through line going through 2 and switching 1 and 3:

- The flip F_3 through line going through 3 and switching 1 and 2:



(2) When the triangle is flipped, the vertices also end up in the new places. Write down the permutations corresponding to the clockwise and the counterclockwise rotations:

(a) Flip F_1:

$$\begin{pmatrix} 1 & 2 & 3 \\ \downarrow & \downarrow & \downarrow \end{pmatrix};$$

(b) Flip F_2:

$$\begin{pmatrix} 1 & 2 & 3 \\ \downarrow & \downarrow & \downarrow \end{pmatrix};$$

(c) Flip F_3:

$$\begin{pmatrix} 1 & 2 & 3 \\ \downarrow & \downarrow & \downarrow \end{pmatrix};$$

When no transformation is performed, we get the *identity permutation:*

$$\begin{pmatrix} 1 & 2 & 3 \\ \downarrow & \downarrow & \downarrow \\ 1 & 2 & 3 \end{pmatrix};$$