**D6 – The symmetries of an equilateral triangle**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | ***I*** | ***R*** | ***R2*** | ***F*** | ***FR*** | ***RF*** |
| ***I***  | *I* | *R* | *R2* | *F* | *FR* | *RF* |
| ***R*** | *R* | *R2* | *I* | *RF* | *F* | *FR* |
| ***R2*** | *R2* | *I* | *R* | *FR* | *RF* | *F* |
| ***F*** | *F* | *FR* | *RF* | *I* | *R* | *R2* |
| ***FR*** | *FR* | *RF* | *F* | *R2* | *I* | *R* |
| ***RF*** | *RF* | *F* | *FR* | *R* | *2R* | *3R* |

“F” is a vertical flip and “R” is 1200 clockwise rotation

The symbols are read from left to right (e.g., RF is the symmetry resulting from rotating the triangle 1200 and then vertically flipping it, whereas FR is the symmetry resulting from vertically flipping the triangle and then rotating it 1200)

**Some things to notice:**

3R = 2F = I (the identity)

RF = FR2

FR = R2F

(FR)(FR) = I

(RF)(RF) = I

I found this group table lying on my desk (I checked that it was associative by testing all 216 cases, you can quickly check the other properties yourself!). Could this group be *D*6 (the symmetries of an equilateral triangle) just with different names?

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| \* | A | B | C | D | E | G |
| A | B | A | D | C | G | E |
| B | A | B | C | D | E | G |
| C | G | C | B | E | D | A |
| D | E | D | A | G | C | B |
| E | D | E | G | A | B | C |
| G | C | G | E | B | A | D |