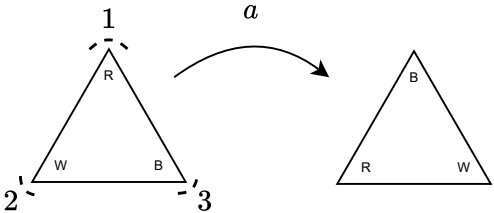
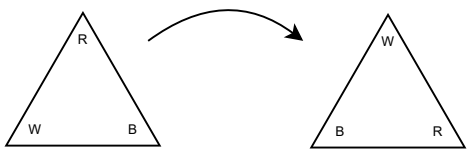
Call motion 1 "a" :



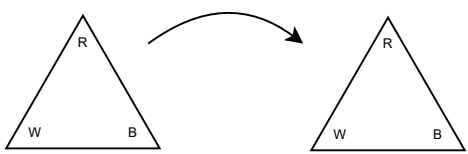
$a^2 = a \cdot a$

$\cdot \implies$ "followed by"

a^2



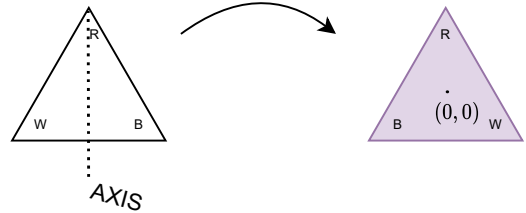
a^3



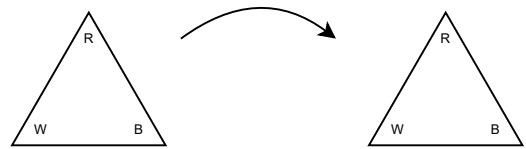
So $a^3 = e$

Next, we must check reflections (call this motion "b")

b

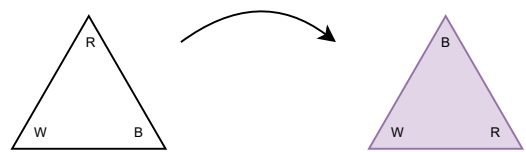


b^2

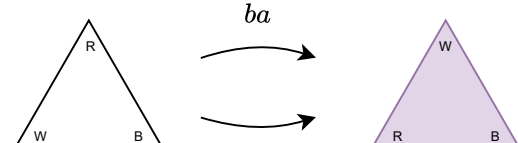


So $b^2 = e$

ab



ba



a^2b

D_3 is non-abelian

Last pair shows $ba = a^2b$