Notation for Symmetries

WDRP - Polyhedra

1. Give an example of an operation which is not associative (Hint: What operation between numbers do we need to distribute across parenthesis?)

2. Verify that the rationals $\mathbb{Q}$ (ie. fractions) are a group under multiplication. (Hint: Check each of the group axioms using arbitrary fractions $\frac{a}{b}$ and $\frac{c}{d}$).

3. Complete the multiplication table for S_3 and D_3. How do the two compare? (Note that in the corresponding box the element in the row is multiplied to the one in the column.)

S_3	ι	$(1\ 2\ 3)$	$(1\ 3\ 2)$		$(1\ 3)$	$(1\ 2)$
ι	ι	$(1\ 2\ 3)$	$(1\ 3\ 2)$	$(2\ 3)$	$(1\ 3)$	$(1\ 2)$
$(1\ 2\ 3)$	$(1\ 2\ 3)$		ι	$(1\ 2)$	$(2\ 3)$	$(1\ 3)$
$(1\ 3\ 2)$			$(1\ 2\ 3)$	$(1\ 3)$		$(2\ 3)$
$(2\ 3)$	$(2\ 3)$	$(1\ 3)$		ι	$(1\ 2\ 3)$	$(1\ 3\ 2)$
	$(1\ 3)$	$(1\ 2)$	$(2\ 3)$	$(1\ 3\ 2)$		$(1\ 2\ 3)$
$(1\ 2)$	$(1\ 2)$	$(2\ 3)$	$(1\ 3)$	$(1\ 2\ 3)$	$(1\ 3\ 2)$	ι

D_3	ι	r		s	sr	sr^2
ι		r	r^2	s	sr	sr^2
r		r^2		sr^2	s	sr
r^2		ι	r	sr	sr^2	s
s		sr		ι	r	r^2
sr			s	r^2	ι	
sr^2		s	sr	r		ι