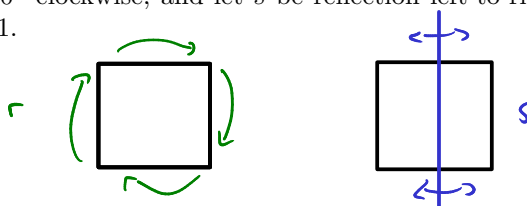


Worksheet 14

Math 392, Abstract Algebra

Monday, February 15, 2021

- Let D_4 be the symmetry group of the square, let $r \in D_4$ be rotation through 90° clockwise, and let s be reflection left-to-right. Then $r^4 = 1$ and $s^2 = 1$.



Decide which elements on the left are equal to which elements on the right:

rs

r^2s

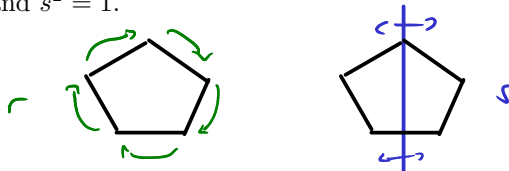
r^3s

sr

sr^2

sr^3

- Same with D_5 , the symmetry group of the regular pentagon. Let $r \in D_5$ be rotation through 72° clockwise, and let s be reflection left-to-right. Then $r^5 = 1$ and $s^2 = 1$.



Decide which elements on the left are equal to which elements on the right:

rs

r^2s

r^3s

r^4s

sr

sr^2

sr^3

sr^4

- Challenge: For any integer k , the rotation $r^k \in D_5$ takes the vertical line to some other line, call it L . Convince yourselves that $r^k s r^{-k}$ is the reflection across L .