Chris Haydut 10/15

Lecture 12 - Exercise C

1. $\varepsilon((145)(39)) = \varepsilon((145))\ \varepsilon((39))$

$= 1 \cdot (-1) = -1$

$\varepsilon((28)(39)(576)) = \varepsilon((28))\ \varepsilon((39))\ \varepsilon((576))$

$= -1 \cdot -1 \cdot -1 = 1$

$\tau\sigma = (28)(39)(576)(145)(39)$

$= (14765)(39)(28)$

$\varepsilon(\tau\sigma) = \varepsilon((14765))\ \varepsilon((39))\ \varepsilon((28))$

$= 1 \cdot -1 \cdot -1$

$= 1$

$\sigma\tau = (145)(39)(28)(39)(576)$

2. ε homomorphism

$\Rightarrow \varepsilon(\alpha\beta) = \varepsilon(\alpha)\varepsilon(\beta)$

Note $\varepsilon(\alpha), \varepsilon(\beta) \in \mathbb{Z}^\times$, an abelian group. So

$$\varepsilon(\alpha\beta) = \varepsilon(\beta)\varepsilon(\alpha)$$
$$= \varepsilon(\beta\alpha)$$

3. $\varepsilon(\sigma^2) = \varepsilon(\sigma)\varepsilon(\sigma)$
$= (\varepsilon(\sigma))^2 =$
$\varepsilon(\sigma) = -1$ or 1
so $(\varepsilon(\sigma))^2 = (-1)^2 = 1$
or $= (1)^2 = 1$

4. σ^ℓ is even if $\varepsilon(\sigma) = 1$
or if $\varepsilon(\sigma) = -1$ and ℓ even.

5. A_6: 1, 3-cycles, 5-cycles, products of pairs of disjoint 2-cycles, products of disjoint 2-cycle and 4-cycle, products of pairs of disjoint 3-cycles