

①

10/5
review1) Define permutation - bijective map $S \rightarrow S$ 2) Define isomorphism - Let $\phi: G \rightarrow H$ ϕ must be bijective and have O.P.If $a, b \in G$, then $\phi(a * b) = \phi(a) * \phi(b)$
 $\uparrow$ $\uparrow$
 ϕ for G ϕ for H F 3) $|A_5| = 120$ should be 60T 4) S_A has a subgroup of 6 elements - fix 1 elementF 5) S_n is not abelian for $n > 1$ $n=2$ works
 $n \geq 3$ not

T 6) Cycles can be own inverses transposition

F 7) Cycle of length n is even if n is evenF 8) $S_4 \cong D_4$ $24 \neq 8$ T 9) $|D_n| = 2n$

F 10) Any two factorizations of a cycle into transpositions has same number of factors

(2)

T 11) The isomorphic image of a group center remains a center

T 12) $2\mathbb{Z} \cong 3\mathbb{Z}$

$m\mathbb{Z} \cong n\mathbb{Z}$ $\left(\frac{n}{m}\right)$

F 13) $S_3 < S_4$

$\mathbb{Z}_2 \ncong \mathbb{Z}_4$

T 14) Every group has at least two operation preserving maps that can be defined.

T 15) A group can be isomorphic to a proper subgroup of itself.

T 16) The set of auto^m of group G is itself a group
 $\text{Aut}(G)$

$\phi: G \times S \rightarrow S$ is a group action on a set

If s is not moved by π (a permutation)

that is $\pi(s) = s$, then π is in the

subgroup (of G) called the stabilizer of s .

③

Find order of:

$$\begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 \\ 2 & 4 & 5 & 3 & 8 & 7 & 6 & 1 \end{bmatrix}$$

~~$(1\ 2\ 4\ 3\ 5\ 8\ 7\ 6)$~~

$$(1\ 2\ 4\ 3\ 5\ 8)(6\ 7)$$

6

2

$$(1\ 3\ 5\ 7\ 2\ 4)(6\ 8\ 9) = (7)$$

factor into transpositions so we

can decide if this element belongs A_9

$$(a_1\ a_2\ a_3\ \dots\ a_n) \rightarrow (a_1\ a_n)(a_1\ a_{n-1})\dots(a_1\ a_2)$$

$$\text{out} \rightarrow (1\ 4)(1\ 2)(1\ 7)(1\ 5)(1\ 3)(6\ 9)(6\ 8) \quad \underline{\underline{\text{odd}}}$$

$$(1\ 3\ 5\ 7\ 2)(4\ 6\ 8\ 9)$$

$$\text{in} \rightarrow (\underline{1}\ \underline{2}\ \underline{3})(\underline{4}\ \underline{5}\ \underline{6})(\underline{7}\ \underline{8}\ \underline{9}) \quad \textcircled{6} \text{ even}$$

Prove or disprove: $\langle \mathbb{Z}, + \rangle \stackrel{?}{=} \langle \mathbb{Q}, + \rangle$

Associate $\frac{m}{n}$ with integer $2^m 3^n$

n/c

$$|\mathbb{Q}| \leq |\mathbb{Z}|$$

$$|\mathbb{Z}| \leq |\mathbb{Q}|$$

$$|\mathbb{Z}| = |\mathbb{Q}|$$
