

A 4.2

Write down conjugacy classes, see website.

Long form	Short form	Young frame	Pertinent cycle structure	Parity	Conjugacy classes to A_4	Number of elements in conjugacy class
[4, 0, 0, 0]	[4]	####	(-)(-)(-)(-)	+	(1)(2)(3)(4)	1
[3, 1, 0, 0]	[3, 1]	###	(-)(-)(-)	-	(12)(3)(4) (13)(2)(4) (14)(2)(3) (23)(1)(4) (24)(1)(3) (34)(1)(2)	6
[2, 2, 0, 0]	[2 ²]	##	(-)(-)	+	(12)(34) (13)(24) (14)(23)	3
[2, 1, 1, 0]	[2, 1 ²]	##	(-)(-)(-)	+	(123)(4) (124)(3) (132)(4) (134)(2) (142)(3) (143)(2) (234)(1) (243)(1)	8
[1, 1, 1, 1]	[1 ⁴]	#####	(-)(-)(-)(-)	-	(1234) (1243) (1324) (1342) (1423) (1432)	6

Theorem of Lagrange: Invariant subgroups have an order that is a divisor of the order of the total group.

Inv. subgroups are unions of conjugacy classes

1: [4] ✓

2: X

3: X

4: [4] ∪ [2²] ✓, isomorphic to $C_2 \times C_2$

6: X

8: X

12: [4] ∪ [2²] ∪ [2, 1²] $\cong A_4$

1 $S_4 / \{e\} \cong S_4$

24 $S_4 / S_4 \cong \{e\}$

4 $S_4 / (C_2 \times C_2) \cong S_3$

12 $S_4 / A_4 \cong C_2$