

The group  $G$  is isomorphic to the group labelled by [ 24, 12 ] in the Small Groups library.

Ordinary character table of  $G \cong S4$ :

|          | $1a$ | $2a$ | $3a$ | $2b$ | $4a$ |
|----------|------|------|------|------|------|
| $\chi_1$ | 1    | 1    | 1    | 1    | 1    |
| $\chi_2$ | 1    | 1    | 1    | -1   | -1   |
| $\chi_3$ | 2    | 2    | -1   | 0    | 0    |
| $\chi_4$ | 3    | -1   | 0    | 1    | -1   |
| $\chi_5$ | 3    | -1   | 0    | -1   | 1    |

Trivial source character table of  $G \cong S4$  at  $p = 2$ :

| Normalisers $N_i$  | $N_1$ | $N_2$ | $N_3$ | $N_4$ | $N_5$ | $N_6$ | $N_7$ |      |
|--|-------|-------|-------|-------|-------|-------|-------|------|
| $p$ -subgroups of $G$ up to conjugacy in $G$   | $P_1$ | $P_2$ | $P_3$ | $P_4$ | $P_5$ | $P_6$ | $P_7$ |      |
| Representatives $n_j \in N_i$  | $1a$  | $3a$  | $1a$  | $1a$  | $1a$  | $3a$  | $1a$  | $1a$ |
| $1 \cdot \chi_1 + 1 \cdot \chi_2 + 0 \cdot \chi_3 + 1 \cdot \chi_4 + 1 \cdot \chi_5$ | 8     | 2     | 0     | 0     | 0     | 0     | 0     | 0    |
| $0 \cdot \chi_1 + 0 \cdot \chi_2 + 1 \cdot \chi_3 + 1 \cdot \chi_4 + 1 \cdot \chi_5$ | 8     | -1    | 0     | 0     | 0     | 0     | 0     | 0    |
| $1 \cdot \chi_1 + 1 \cdot \chi_2 + 2 \cdot \chi_3 + 1 \cdot \chi_4 + 1 \cdot \chi_5$ | 12    | 0     | 4     | 0     | 0     | 0     | 0     | 0    |
| $1 \cdot \chi_1 + 0 \cdot \chi_2 + 0 \cdot \chi_3 + 1 \cdot \chi_4 + 0 \cdot \chi_5$ | 4     | 1     | 0     | 2     | 0     | 0     | 0     | 0    |
| $1 \cdot \chi_1 + 0 \cdot \chi_2 + 1 \cdot \chi_3 + 1 \cdot \chi_4 + 0 \cdot \chi_5$ | 6     | 0     | 2     | 2     | 2     | 0     | 0     | 0    |
| $1 \cdot \chi_1 + 1 \cdot \chi_2 + 0 \cdot \chi_3 + 0 \cdot \chi_4 + 0 \cdot \chi_5$ | 2     | 2     | 2     | 0     | 0     | 2     | 2     | 0    |
| $0 \cdot \chi_1 + 0 \cdot \chi_2 + 1 \cdot \chi_3 + 0 \cdot \chi_4 + 0 \cdot \chi_5$ | 2     | -1    | 2     | 0     | 0     | 2     | -1    | 0    |
| $1 \cdot \chi_1 + 0 \cdot \chi_2 + 1 \cdot \chi_3 + 0 \cdot \chi_4 + 1 \cdot \chi_5$ | 6     | 0     | 2     | 0     | 0     | 0     | 0     | 2    |
| $1 \cdot \chi_1 + 0 \cdot \chi_2 + 0 \cdot \chi_3 + 0 \cdot \chi_4 + 0 \cdot \chi_5$ | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1    |

$$P_1 = \text{Group}([(())]) \cong 1$$

$$P_2 = \text{Group}([(1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21)]) \cong C2$$

$$P_3 = \text{Group}([(1, 2)(3, 13)(4, 8)(5, 7)(6, 9)(10, 21)(11, 20)(12, 16)(14, 18)(15, 17)(19, 24)(22, 23)]) \cong C2$$

$$P_4 = \text{Group}([(1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21), (1, 2)(3, 13)(4, 8)(5, 7)(6, 9)(10, 21)(11, 20)(12, 16)(14, 18)(15, 17)(19, 24)(22, 23)]) \cong C2 \times C2$$

$$P_5 = \text{Group}([(1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21), (1, 4)(2, 7)(3, 10)(5, 12)(6, 14)(8, 16)(9, 17)(11, 19)(13, 20)(15, 22)(18, 23)(21, 24)]) \cong C2 \times C2$$

$$P_6 = \text{Group}([(1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21), (1, 7, 12, 8)(2, 4, 16, 5)(3, 20, 19, 21)(6, 17, 22, 18)(9, 14, 23, 15)(10, 24, 11, 13)]) \cong C4$$

$$P_7 = \text{Group}([(1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21), (1, 2)(3, 13)(4, 8)(5, 7)(6, 9)(10, 21)(11, 20)(12, 16)(14, 18)(15, 17)(19, 24)(22, 23), (1, 4)(2, 7)(3, 10)(5, 12)(6, 14)(8, 16)(9, 17)(11, 19)(13, 20)(15, 22)(18, 23)(21, 24)]) \cong D8$$

$$N_1 = \text{Group}([(1, 2)(3, 13)(4, 8)(5, 7)(6, 9)(10, 21)(11, 20)(12, 16)(14, 18)(15, 17)(19, 24)(22, 23), (1, 3, 9)(2, 6, 13)(4, 11, 23)(5, 19, 17)(7, 15, 24)(8, 22, 20)(10, 18, 12)(14, 21, 16), (1, 4)(2, 7)(3, 10)(5, 12)(6, 14)(8, 16)(9, 17)(11, 19)(13, 20)(15, 22)(18, 23)(21, 24), (1, 5)(2, 8)(3, 11)(4, 12)(6, 15)(7, 16)(9, 18)(10, 19)(13, 21)(14, 22)(17, 23)(20, 24)]) \cong S4$$

$$N_2 = \text{Group}([(1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21), (1, 2)(3, 13)(4, 8)(5, 7)(6, 9)(10, 21)(11, 20)(12, 16)(14, 18)(15, 17)(19, 24)(22, 23), (1, 4)(2, 7)(3, 10)(5, 12)(6, 14)(8, 16)(9, 17)(11, 19)(13, 20)(15, 22)(18, 23)(21, 24)]) \cong D8$$

$$N_3 = \text{Group}([(1, 2)(3, 13)(4, 8)(5, 7)(6, 9)(10, 21)(11, 20)(12, 16)(14, 18)(15, 17)(19, 24)(22, 23), (1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21)]) \cong C2 \times C2$$

$$N_4 = \text{Group}([(1, 2)(3, 13)(4, 8)(5, 7)(6, 9)(10, 21)(11, 20)(12, 16)(14, 18)(15, 17)(19, 24)(22, 23), (1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21), (1, 4)(2, 7)(3, 10)(5, 12)(6, 14)(8, 16)(9, 17)(11, 19)(13, 20)(15, 22)(18, 23)(21, 24)]) \cong D8$$

$$N_5 = \text{Group}([(1, 4)(2, 7)(3, 10)(5, 12)(6, 14)(8, 16)(9, 17)(11, 19)(13, 20)(15, 22)(18, 23)(21, 24), (1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21), (1, 2)(3, 13)(4, 8)(5, 7)(6, 9)(10, 21)(11, 20)(12, 16)(14, 18)(15, 17)(19, 24)(22, 23), (1, 3, 9)(2, 6, 13)(4, 11, 23)(5, 19, 17)(7, 15, 24)(8, 22, 20)(10, 18, 12)(14, 21, 16)]) \cong S4$$

$$N_6 = \text{Group}([(1, 7, 12, 8)(2, 4, 16, 5)(3, 20, 19, 21)(6, 17, 22, 18)(9, 14, 23, 15)(10, 24, 11, 13), (1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21), (1, 2)(3, 13)(4, 8)(5, 7)(6, 9)(10, 21)(11, 20)(12, 16)(14, 18)(15, 17)(19, 24)(22, 23)]) \cong D8$$

$$N_7 = \text{Group}([(1, 4)(2, 7)(3, 10)(5, 12)(6, 14)(8, 16)(9, 17)(11, 19)(13, 20)(15, 22)(18, 23)(21, 24), (1, 2)(3, 13)(4, 8)(5, 7)(6, 9)(10, 21)(11, 20)(12, 16)(14, 18)(15, 17)(19, 24)(22, 23), (1, 12)(2, 16)(3, 19)(4, 5)(6, 22)(7, 8)(9, 23)(10, 11)(13, 24)(14, 15)(17, 18)(20, 21)]) \cong D8$$