

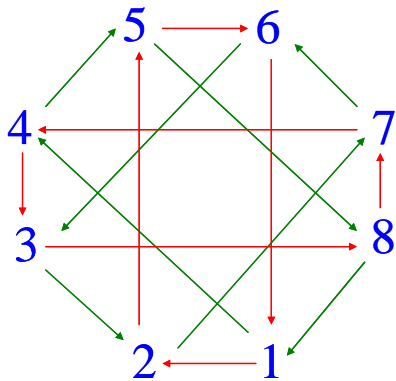
Lesson 25

QUATERNION GROUP Q

Generators:

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

Generator Diagram:



Order:

8

Elements:

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

Is Abelian?

No

Lesson 25

Subgroups (conjugates for a given order shown in the same, non-blue color):

{ $()$, $(1,2,5,6)(3,8,7,4)$, $(1,3,5,7)(2,4,6,8)$, $(1,4,5,8)(2,7,6,3)$, $(1,5)(2,6)(3,7)(4,8)$,
 $(1,6,5,2)(3,4,7,8)$, $(1,7,5,3)(2,8,6,4)$, $(1,8,5,4)(2,3,6,7)$ }

Normal
 even

$$\left\{ \begin{array}{c} () \\ (1,3,5,7)(2,4,6,8) \\ (1,7,5,3)(2,8,6,4) \\ (1,5)(2,6)(3,7)(4,8) \end{array} \right\}$$

normal

$$\left\{ \begin{array}{c} () \\ (1,2,5,6)(3,8,7,4) \\ (1,6,5,2)(3,4,7,8) \\ (1,5)(2,6)(3,7)(4,8) \end{array} \right\}$$

normal

$$\left\{ \begin{array}{c} () \\ (1,4,5,8)(2,7,6,3) \\ (1,8,5,4)(2,3,6,7) \\ (1,5)(2,6)(3,7)(4,8) \end{array} \right\}$$

normal

$$\left\{ \begin{array}{c} () \\ (1,5)(2,6)(3,7)(4,8) \end{array} \right\}$$

normal
 center
 commutator (derived)

$$\{()\}$$

normal