

## Lesson 25

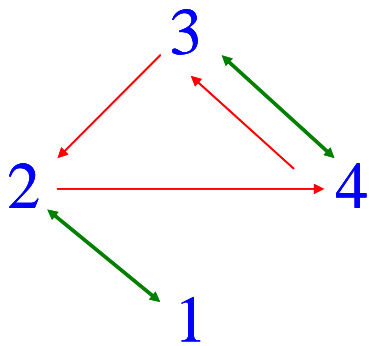
### ALTERNATION GROUP OF DEGREE 4

$$A_4$$

Generators:

$(2,4,3), (1,2)(3,4)$

Generator Diagram:



Order:

12

Elements:

$\{ (), (2,3,4), (2,4,3), (1,2)(3,4), (1,2,3), (1,2,4), (1,3,2), (1,3,4), (1,3)(2,4), (1,4,2), (1,4,3), (1,4)(2,3) \}$

Is Abelian?

No

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

{  $()$ ,  $(2,3,4)$ ,  $(2,4,3)$ ,  $(1,2)(3,4)$ ,  $(1,2,3)$ ,  $(1,2,4)$ ,  $(1,3,2)$ ,  $(1,3,4)$ ,  $(1,3)(2,4)$ ,  $(1,4,2)$ ,  $(1,4,3)$ ,  $(1,4)(2,3)$  }

normal, even

$$\left\{ \begin{array}{l} () \\ (1,2)(3,4) \\ (1,3)(2,4) \\ (1,4)(2,3) \end{array} \right\}$$

normal

commutator (derived)

$$\left\{ \begin{array}{l} () \\ (1,3,4) \\ (1,4,3) \end{array} \right\} \quad \left\{ \begin{array}{l} () \\ (1,2,4) \\ (1,4,2) \end{array} \right\} \quad \left\{ \begin{array}{l} () \\ (1,2,3) \\ (1,3,2) \end{array} \right\} \quad \left\{ \begin{array}{l} () \\ (2,3,4) \\ (2,4,3) \end{array} \right\}$$
$$\left\{ \begin{array}{l} () \\ (1,4)(2,3) \end{array} \right\} \quad \left\{ \begin{array}{l} () \\ (1,2)(3,4) \end{array} \right\} \quad \left\{ \begin{array}{l} () \\ (1,3)(2,4) \end{array} \right\}$$
$$\{()\}$$

normal

center