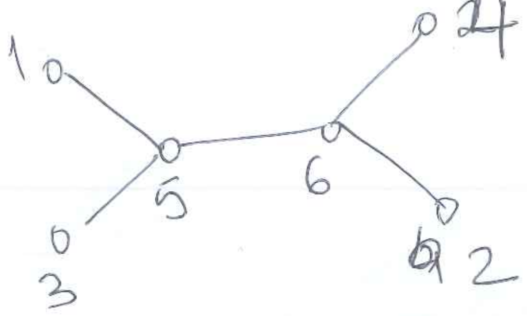
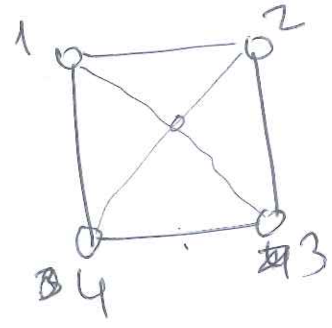
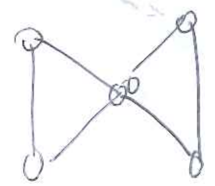




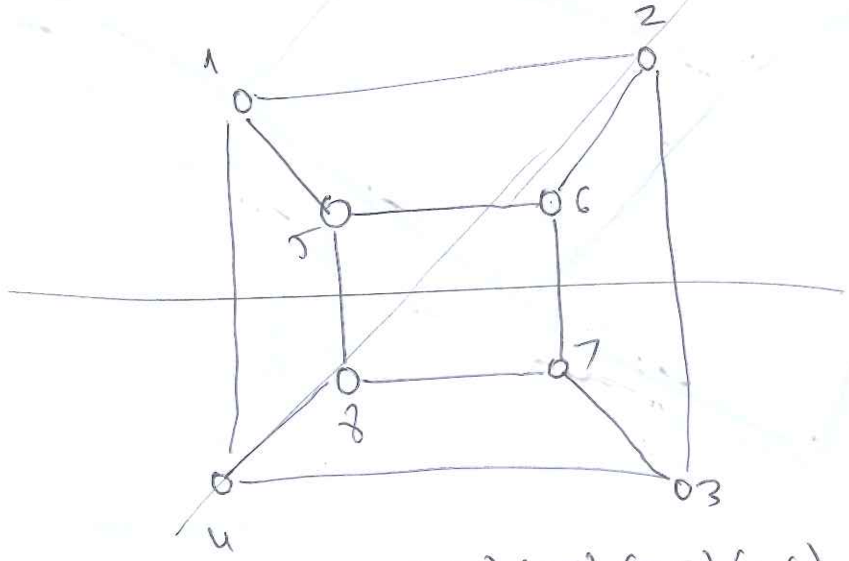
$t = (\overset{1234}{\cancel{1432}})(56)$



$t = (1\ 2\ 3\ 4)$

$s = (13)$

$s = \cancel{(23}\ (13)$



Aut(CubGraph) $\overset{??}{\cong} S_4 \times C_2$?

$A_3 \triangleleft S_3$

C_2

(17) (28) (35) (46)

$H \triangleleft G$

K

$H \cap K = id_G$

$$\begin{pmatrix} -1 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & -1 \end{pmatrix}$$

$\underbrace{hkh^{-1}}_{k}k^{-1} \in$

(14)(58)(67)(23)

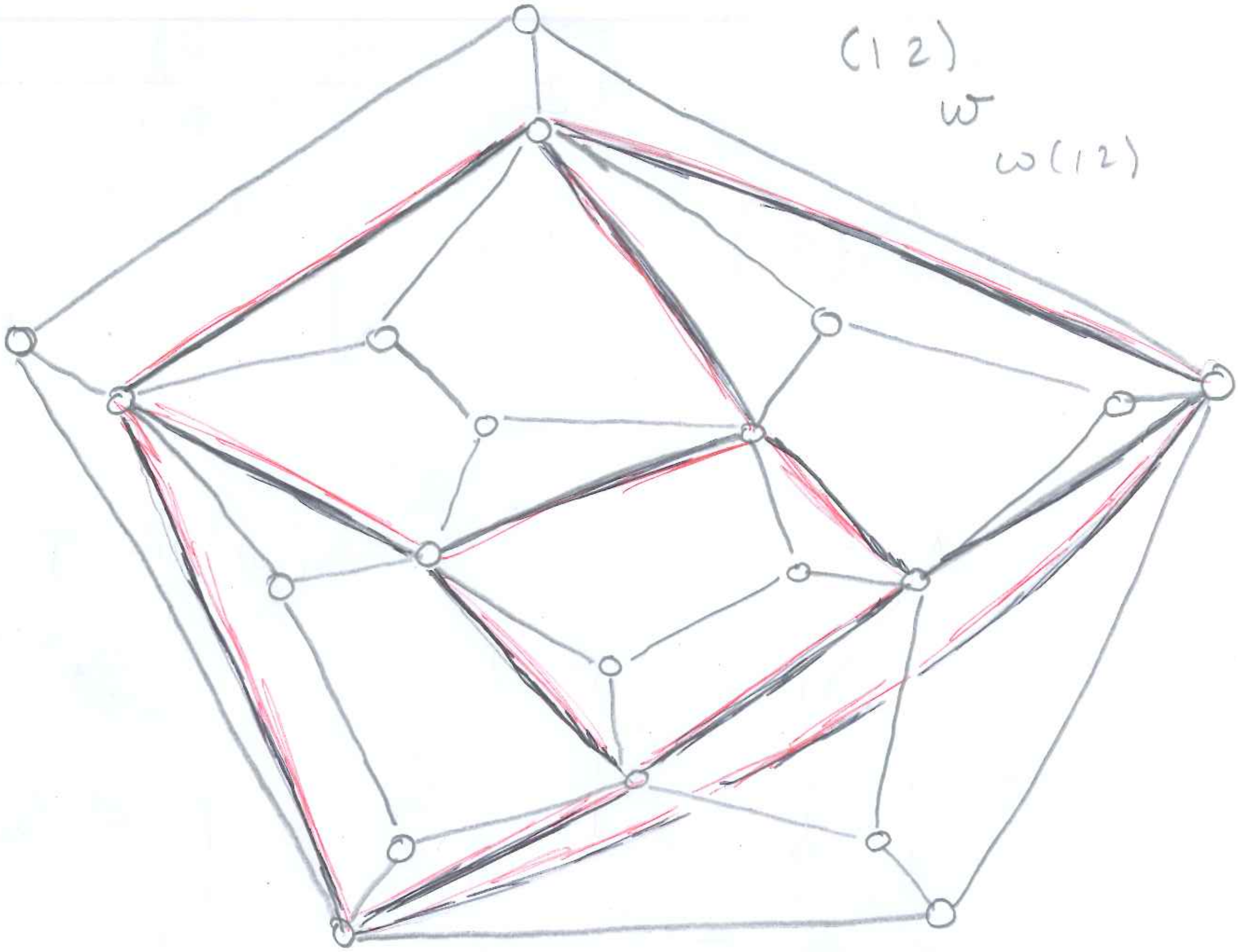
(14)(23) | (58)(67)

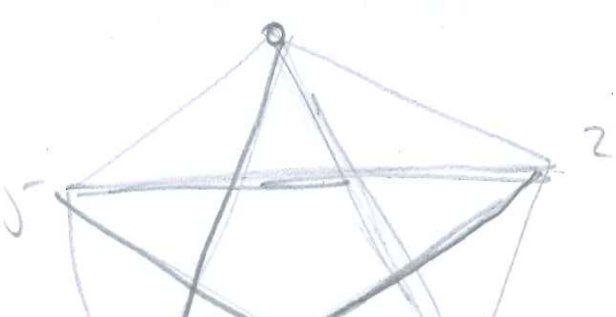
(1234)

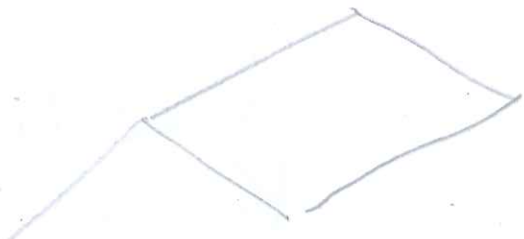
$w \longmapsto (-1)^{inv(w)}$ $\quad S_n \longrightarrow \{\pm 1\}$

$(1\,2)$

$w \quad w(1\,2)$







$C_{13}, \; C_{24}, \; C_{35}, \; C_{41}, \; C_{52}$

13 $\quad$ 24 $\quad$ 35 $\quad$ 41

Ex: Show that the homorphism

~~Aut (Dodecahedron~~

$$G_{\text{Dodecahedron}} \longrightarrow S_5$$

(permutations of the set of cubes)

is an iso. onto A_5.

Defn (official) A representation of a group G on a vector Space V is a homomorphism

$$\rho : G \longrightarrow GL(V).$$

$\boxed{\text{equiv.}}$

A rep of G on V is a gp. action of G on V with the additional condition that $\forall\, g \in G$, g acts on V by a linear map.

$\varphi : \mathbb{Q}^3 \longrightarrow \mathbb{Q}[\underline{3}]$ by

$$e_1 \longmapsto \delta_1$$
$$e_2 \longmapsto \delta_2$$
$$e_3 \longmapsto \delta_3$$

$$\rho_2(\omega)\,\phi(e_i) \overset{??}{=} \phi(\rho_1(\omega)e_i)$$

$$\rho_2(\omega)\,\phi(e_i) = \rho_2(\omega)\delta_i = \delta_{\omega(i)}$$

$$\phi(\rho_1(\omega)e_i) = \delta_{\omega^{-1}(i)}$$

$$(\rho_1(\omega)e_i)_j = (e_i)_{\omega(j)} = \delta_{\omega^{-1}(i)}$$

$$\delta_{i\,\omega(j)}$$

$$\rho_2(\omega)\,\delta_i(j)$$

$$= \delta_{\omega^{-1}(i)\,j}$$

$$= \delta_i(\omega^{-1}(j)) = \delta_{i\,\omega^{-1}(j)} = \begin{cases} 1 \text{ if } j = \omega(i) \\ \end{cases}$$

$$(P_2(\omega_1\omega_2)f)(x) \overset{?}{=} [\rho_2(\omega_1)(\rho_2(\omega_2)f)](x)$$

$$f((\omega_1\omega_2)^{-1}x)$$

$$= \rho_2(\omega_2)f\,(\omega_1^{-1}x) = f(\omega_2^{-1}\omega_1^{-1}x)$$