$$\bigcup_g g H g^{-1} = \{ g h g^{-1} : h \in H, g \in G \} = \bigcup_h {}^G h .$$

$$|G| = \sum_{\substack{orbit \\ g}} |{}^G g|$$

$$|H \cap C| + [G:H] \cdot |H \setminus C| \quad ?$$

$$g h g^{-1} \in f H f^{-1}_{\ c} \Longleftrightarrow h \in g^{-1} f H f^{-1} g \setminus C$$

h comm. w/ $g^{-1} f$, not w/ all elts.

$$K = \bigcap_{g \in G} g H g^{-1}, \qquad g H g^{-1} / K .$$

$$G / K = \bigcup_{g \in G} {}^g H g^{-1} / K .$$

$$g H g^{-1} / K$$

$$\underline{[G:K] = [H:K] \cdot [G:H]}$$

$$\Rightarrow \quad [G:H] = \# \left\{ gHg^{-1} \mid g \in G \right\}$$

$$\text{but } \left| gHg^{-1} \right| = H, \quad \text{and} \quad gHg^{-1} \ni 1, \text{ so}$$

$$G < [G:H] \left(|H|-1 \right) \qquad \qquad \}.$$

$$X = \left\{ gHg^{-1} \right\}, \qquad G \circlearrowright X \quad \text{conj.}$$

$$|X| = \frac{|G|}{|\text{Stab}_G(H)|} \leq [G:H] \qquad \text{also works.}$$