# Scratch paper for Math 8510, HW 6
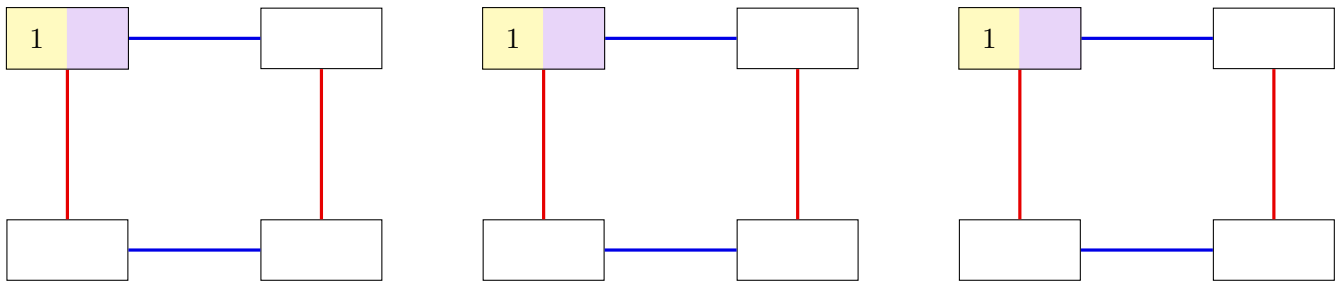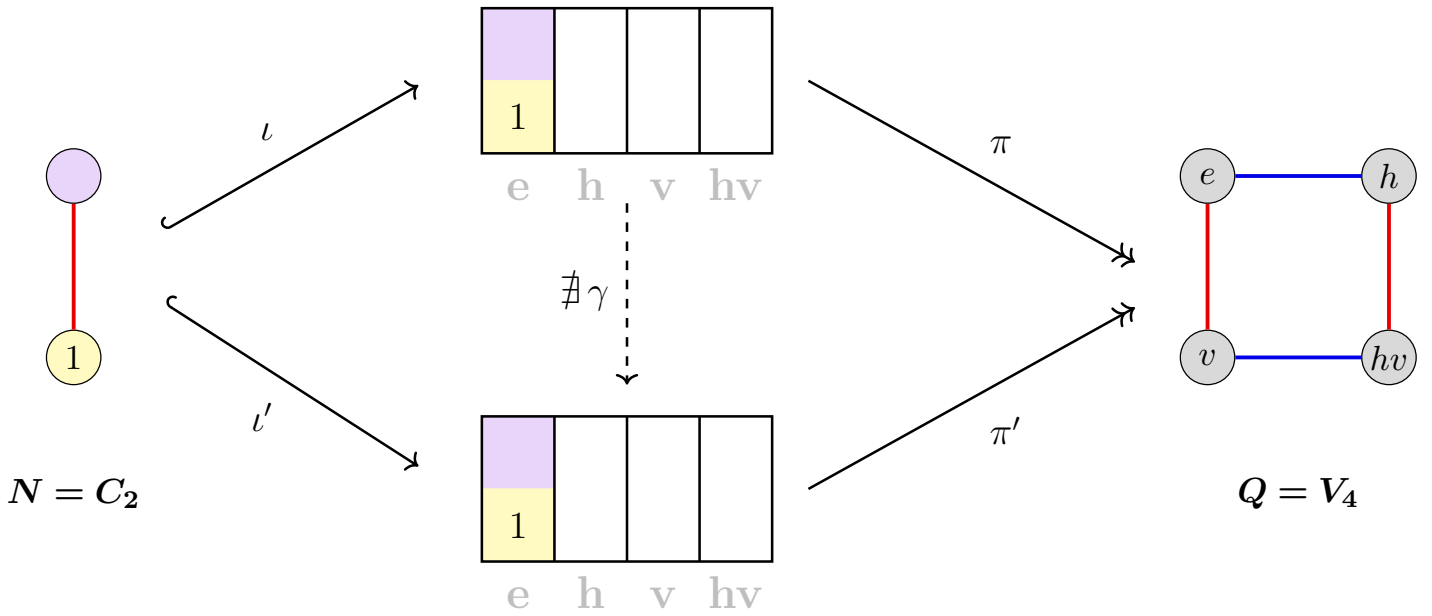
**#1(b)**: Three non-equivalent extensions $C_2 \hookrightarrow G \twoheadrightarrow V_4$.



$$N = C_2 \qquad\qquad Q = V_4$$

**#1(b)**: All extensions $C_2 \hookrightarrow G \twoheadrightarrow V_4$ are equivalent, because they differ by some $\gamma \in \mathrm{Aut}(G)$. An example of two are shown below.



$N = C_2$

$\iota$

$\pi$

$\gamma$

$\iota'$

$\pi'$

$Q = V_4$

e   h   v   hv

e   h   v   hv

e   h   v   hv

$\xmapsto{\gamma}$