Exercises 10 2024

1. Suppose $0 \to A \xrightarrow{i} H \xrightarrow{p} G \to 0$ is a ses of groups, A abelian, & $s : G \to H$ a section of p (as a function)

   Show that $g * a = s(g).i(a).s(g)^{-1}$ makes A a G-module.

   - Show the G-module structure is independent of the choice of section s.

2. Check that the formula
   $$\varphi_n : \mathbb{Z}G[G^n] \longrightarrow \mathbb{Z}[G^{n+1}]$$
   $$(g_0, \dots, g_{n-1}) \longmapsto (1, g_0, g_0 g_1, \dots, g_0 g_1 \cdots g_n)$$
   does in fact induce a bijection on basis elements.

3. Show that
   $$\mathrm{Coinv}(M) \cong i\mathbb{Z} \otimes_{\mathbb{Z}G} M.$$