**1.** Let $A = K\Gamma/I$ for some finite graph $\Gamma$ with $\Gamma = (V, E)$ and $V = \{1, 2, \ldots, n\}$. As usual, let $S(i)$ be the $i$'th simple right $A$-module. Show that the number of arrows $i \to j$ in $\Gamma$ is equal to $\dim_K \mathrm{Ext}^1_A(S(i), S(j))$.

**2.** Find the Gabriel quiver of the following group algebras:

a) $\mathbb{F}_2[V]$, where $V$ is the Klein group;

b) $\mathbb{F}_3[S_3]$, where $S_3$ is the symmetric group on 3 letters.

Determine, whether the corresponding group algebra is a path algebra modulo some relations.

**3.** Show that:

a) $\mathbb{Z}_{p^n} \hookrightarrow \mathbb{Z}_{p^{n+1}} \oplus \mathbb{Z}_{p^{n-1}}$ is left minimal left almost split and

b) $\mathbb{Z}_{p^{n+1}} \oplus \mathbb{Z}_{p^{n-1}} \twoheadrightarrow \mathbb{Z}_{p^n}$ is right minimal right almost split in the category of Abelian groups.

**4.** Check which of the following algebras are Nakayama algebras:

a) $K[x]/(x^n)$, where $n \geq 2$;

b) $T_n(K)$, the ring of upper triangular matrices over $K$;

c) $K[\mathbb{Z}_{p^n}]$, where $K$ is a field of characteristic $p$;

d) $\mathbb{F}_2[V]$, where $V$ is the Klein group.