



1. Γ is a $\mathbb{Q}$ -algebra
2. $\text{PIR}(\Gamma) = \{ \rho \in \text{Hom}(\Gamma, \mathbb{Q}) \mid \rho(\gamma) \in \mathbb{Q} \}$
3. $\tilde{\Gamma} = \Gamma \oplus \mathbb{Q}$

