

Let  $\zeta$  be a primitive  $p$ -th root of unity, and let  $G = \langle x \rangle$ . The map  $x \rightarrow \zeta$  extends to a surjective ring homomorphism  $QG \rightarrow Q(\zeta)$ . Therefore, one of the simple components of  $QG$  is  $Q(\zeta)$ . On the other hand,  $QG$  also has a simple component  $Q$ . Since  $\dim_Q(Q \times Q(\zeta)) = 1+p-1 = p$ , we must have  $QG \cong Q \times Q(\zeta)$ . For any commutative ring  $R$ , let  $U_0(R)$  denote the group of units of finite order in  $R$ . Then  $U_0(QG) \cong U_0(Q) \times U_0(Q(\zeta)) \cong \{\pm 1\} \times U_0(Q(\zeta))$ . We finish by noting that  $U_0(Q(\zeta))$  is the group of roots of unity in  $Q(\zeta)$ , which is just the group  $\langle -\zeta \rangle = \langle \pm 1 \rangle \times \langle \zeta \rangle$