

Q2: By assumption  $|P| = p^\alpha$  and  $|Q| = q^\beta$  for some  $\alpha, \beta$ . Consider some element  $r \in P \cap Q$ . We know that  $|\langle r \rangle| \mid p^\alpha$  and  $|\langle r \rangle| \mid q^\beta$ . Therefore  $|\langle r \rangle| = 1$  and hence  $r = e$ . Thus  $P \cap Q = \{e\}$