Abstract algebra Quiz ♯2
(May. 18, 2022)

Provide a suitable explanation for all your answers. It must be **accurate** at every step.

1. [10pts] Let G be a group of order 10. Prove that G contains an element of order 2.

2. [20pts]

   (a) Find **all** elements in $(\mathbb{Z}_{20}, +)$ with the same order as 8.

   (b) List **all** the subgroups of $(\mathbb{Z}_{20}, +)$. (단, 원소나열법으로)

3. [20pts]

   Let G be a cyclic group of order 100.

   (a) Show that $\{g \in G : g^{15} = e\}$ is a subgroup of G.

   (b) Find the order of $\{g \in G : g^{15} = e\}$.