Abstract Algebra I (graduation)
Date 2023.11)

1. Determine if each of the following statements is true. Justify your answer.

   (1) (10 pt) Let $H = \{8a + 30b : a, b \in \mathbb{Z}\}$ be a subset of an abelian group of integers $(\mathbb{Z}, +)$. H must be a cyclic subgroup of $\mathbb{Z}$.

   (2) (10 pt) If K is a subgroup of a group G with the index $[G : K] = 2$, then K is a normal subgroup of G.

3 (10 pt) Classify all abelian group G of order $|G| = 100$ up to isomorphism.

This is the end.