

1. (4 points) Consider  $G = \mathbb{Z}_n \oplus \mathbb{Z}_m$ . What must be true about  $m$  and  $n$  in order for  $G$  to be a cyclic group? Prove your answer.

2. (2 points) Find an example of a specific group  $G$  and subgroups  $H$  and  $K$  such that  $|H| = 24$ ,  $|K| = 18$  but with  $H \not\subseteq K$  and  $K \not\subseteq H$ . Then find  $H \cap K$ .