7. Let $G$ be the group $U_2 \times U_4$. (a) LIST the elements of the set

$$S = \{ g \in G \mid g * g = \text{id} \}.$$ 

(b) Is $S$ a subgroup of $G$? Justify your answer to (b).

(a) $S = \{ (1,1), (1,-1), (-1,1), (-1,-1) \}$

(b) Yes. Problem 5 applies.

8. Give an example of a non-cyclic abelian group of order 16. I do not need to see many details.

$U_4 \times U_4$ is abelian, has order 16, and every element has order 4 or less.