

- (f) A subgroup H of $\mathbb{Z}_4 \times \mathbb{Z}_8$ which is NOT of the form $H = A \times B$, where $A \leq \mathbb{Z}_4$ and $B \leq \mathbb{Z}_8$.
- (g) Two different products of cyclic groups (use \mathbb{Z}_n 's, not other cyclic groups you happen to know) which are isomorphic to $\mathbb{Z}_{36} \times \mathbb{Z}_{50}$. (Not including the given product, and don't just reorder factors.)
- (h) A group with at least 10 different elements of order 5.
2. (6 points) The following table is a group table for a group G of order 8 of an isomorphism type we have not encountered yet. (It's called the quaternion group.) Show that G is not isomorphic to any abelian group of order 8 or to D_4 and justify your answer.

	1	-1	i	$-i$	j	$-j$	k	$-k$
1	1	-1	i	$-i$	j	$-j$	k	$-k$
-1	-1	1	$-i$	i	$-j$	j	$-k$	k
i	i	$-i$	-1	1	k	$-k$	$-j$	j
$-i$	$-i$	i	1	-1	$-k$	k	j	$-j$
j	j	$-j$	$-k$	k	-1	1	i	$-i$
$-j$	$-j$	j	k	$-k$	1	-1	$-i$	i
k	k	$-k$	j	$-j$	$-i$	i	-1	1
$-k$	$-k$	k	$-j$	j	i	$-i$	1	-1