Name:

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MATH 113, QUIZ #3 SEPTEMBER 10

1. Find three proper nontrivial subgroups of $GL(\mathbb{R},3)$ (the group of 3×3 invertible matrices), no two of which are isomorphic. You don't need to show that each one is a subgroup, but briefly explain why they are not isomorphic.

Tons of examples -> ensitest to show \$\frac{1}{2}\$ using

cardinality

invertible

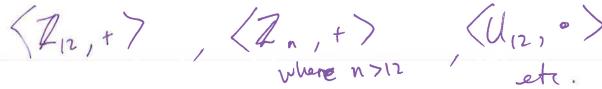
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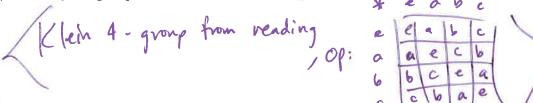
2. Prove or give a counterexample (with explanation): if G is an abelian group and $\varphi: G \to H$ is a group homomorphism, then H is an abelian group.

False, see HW3, problem 36.

- 3. Give an example of each of the following. No justification necessary.
 - (a) A cyclic group with at least 12 elements.



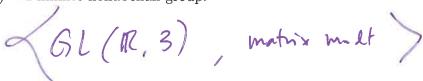
(b) A noncyclic group with 8 or fewer elements.



(c) A group which is infinite and cyclic.



(d) An infinite nonabelian group.



(e) An infinite abelian group that is not cyclic,

