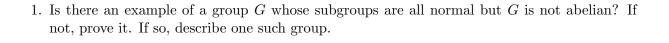
Math 230a: Algebra In-Class Exam 2

Monday, November 16 2015.

NAME:

- You have 50 minutes for this exam. Pace yourself, and do not spend too much time on any one problem.
- Show your work and justify all of your answers. The more you explain your thought process, the easier it will be to give partial credit for incomplete solutions.
- This is a closed-book exam. No notes or outside resources can be used. Do not use a calculator.
- If you need more room, use extra pages, and indicate clearly that you have done so.
- You may use results that we proved in lecture or on the homework without proving them here provided you clearly state the result your are using.

Problems	
1	
2	
3	
4	
5	
Total	



- 2. (a) For which positive integers n does S_n contain a subgroup isomorphic to $\mathbb{Z}/7\mathbb{Z}$?
 - (b) For which positive integers n does S_n contain a subgroup isomorphic to $\mathbb{Z}/14\mathbb{Z}$?

3.	Show	that	a simp	ole grou	p with 1	168 elem	ents has	at least	14 eleme	ents of or	der 3.	
4.	Prove	e that	t if G is	s a finit	e group	of order	at least	3, then	G has a	nontrivia	l automo	rphism.

5.	Show that if G is a finite group of odd order and $N \subset G$ is a normal subgroup of order 5 then N is in the center of G .							