

Math Studies Algebra: homework #8*

Due 26 October 2016, at start of class

Collaboration and use of external sources are permitted, but must be fully acknowledged and cited. For your own learning, you are advised to work individually. Collaboration may involve only discussion; all the writing must be done individually.

Homework must be submitted in L^AT_EX via e-mail under the same rules as the previous homeworks.

1. Let G be a group and let N be its normal subgroup. Show that G is solvable if and only if both N and G/N are solvable.
2. True or false: semidirect product of two solvable groups is solvable.
3. A subring M of R is *maximal* if there is no proper subring R' of R such that M is a proper subring of R' . Does every ring with at least two elements contain a maximal subring?
4. (Bonus problem) Enjoy your break.

*This homework is from <http://www.borisbukh.org/MathStudiesAlgebra1617/hw8.pdf>.