

Math 534. Written problems, set 1. Due Thursday, September 22.

- (1) Let \mathfrak{g} be a Lie algebra.
 - (a) Show that if \mathfrak{h} is an ideal in \mathfrak{g} , then $[\mathfrak{h}, \mathfrak{h}]$ is also an ideal in \mathfrak{g} .
 - (b) Let $\mathcal{D}^k \mathfrak{g}$ be the k -th term of the derived series of \mathfrak{g} . Show that it is an ideal in \mathfrak{g} .
 - (c) Show that \mathfrak{g} is semisimple if and only if it has no non-trivial abelian ideals.
- (2) Humphreys, Exercise 3 on p.5.
- (3) Humphreys, Exercise 6 on p.5.