Problem Set 9
Due Friday, December 8.

Algebra

Math 110A, Fall Quarter 2017

1. Do problems 5.3.1, 5.3.3, 5.3.8, 5.3.9 in the textbook.
2. Do problems 6.1.3, 6.1.9, 6.1.10, 6.1.12, 6.1.40 in the textbook.
3. Let R be a commutative ring with identity. Show that the set of nilpotent elements of R is an ideal of R. This ideal is called the **nilradical** of R, denoted by $\mathrm{Nil}(R)$. (Hint: Problem 3 on Problem Set 5.)
4. Do problems 6.2.6, 6.2.11, 6.2.13, 6.2.20, 6.2.22 in the textbook.
5. Let R be a commutative ring with identity. One says that R is **reduced** if $\mathrm{Nil}(R) = \{0_R\}$. Show that the ring $R/\mathrm{Nil}(R)$ is reduced.