MATH 3360 HOMEWORK ASSIGNMENT 14

DUE ON TUESDAY 21 APRIL 2020

- (1) Let R be a ring. Show that for subrings $R' \subseteq R$ and $R'' \subseteq R$ also the subset $R' \cap R''$ is a subring of R.
- (2) Let R be a ring. An element x ∈ R is called an *idempotent* if x² = x holds.
 (a) Show that every ring has an idempotent.
 - (b) Show that if R has a multiplicative identity, 1, then an element x is an idempotent if and only if 1 x is an idempotent.
- (3) Find all group homomorphisms $\mathbb{Z}_5 \longrightarrow \mathbb{Z}_{15}$, and decide with ones are also ring homomorphisms.