

**Fall 2018, Math 320: Week 5 Preliminary Problems**  
**Due: Thursday, September 27th, 2018**  
**Properties of Rings**

**Preliminary problems.** These problems should be completed before discussion on Thursday.

(P1) List the elements of  $\mathbb{Z}_8$ . Decide whether each is (i) a zero-divisor, (ii) a unit, or (iii) neither.

(P2) Suppose  $R$  is a (not necessarily commutative) ring. Expand  $(a + b)^2$  using distributivity.