

**Spring 2019, Math 320: Preliminary Problem Set 5**  
**Due: Thursday, February 28th, 2019**  
**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.