

## MATH 304 HOMEWORK 5

YOUR NAME GOES HERE

DUE OCTOBER 12, 2018

Let  $R$  and  $S$  be commutative rings with identity  $1_R$  and  $1_S$ , respectively. Define

$$T = R \oplus S = \{(r, s) \mid r \in R, s \in S\},$$

the *direct sum* of  $R$  and  $S$ . Define addition on  $T$  by  $(r_1, s_1) + (r_2, s_2) := (r_1 + r_2, s_1 + s_2)$  and multiplication by  $(r_1, s_1) \cdot (r_2, s_2) := (r_1 \cdot r_2, s_1 \cdot s_2)$ .

**Theorem I.** As defined above,  $T$  is a commutative ring with identity.

*Proof.*

□

**Theorem J.** Let  $R$  be a finite commutative ring with no zero divisors and at least two elements. Then  $R$  has a multiplicative inverse.

*Proof.*

□