

## MA261 – Homework #5

Due Monday, October 7, in class

In preparation for class, start reading at 1.38 and working on the proofs. In particular, try writing out proofs for 1.42, 1.43, 1.45, 1.48, and 1.51.

Also, there will be a quiz on Monday.

1.

- (a) Prove the following theorem: Let  $a$  and  $n$  be integers with  $n > 0$ . If  $(a, n) = 1$ , then there exists an integer  $z$  such that  $az \equiv 1 \pmod{n}$ .

Suggestion: Begin by using Theorem 1.38.

- (b) Give a specific example to show that if in this theorem we drop the hypothesis that  $(a, n) = 1$ , then the conclusion may not be true.

2.

- (a) Prove Theorem 1.41: Let  $a$ ,  $b$ , and  $c$  be integers. If  $a|bc$  and  $(a, b) = 1$ , then  $a|c$ .

Suggestion: Begin by using Theorem 1.38. Then multiply through by something useful.

- (b) Give a specific example to show that if in this theorem we drop the hypothesis that  $(a, b) = 1$ , then the conclusion may not be true.