

**MATH 113: DISCRETE STRUCTURES
HOMEWORK 33**

Problem 1. Use the Euclidean algorithm to compute the following (showing your work):

- (a) $\gcd(28, 63)$ (b) $\gcd(234, 286)$ (c) $\gcd(51, 894)$.

Problem 2. Use the Euclidean algorithm to compute the gcd of 204 and 168 and then use back-substitution to find integers m and n such that

$$\gcd(204, 168) = 204m + 168n.$$

Show your work. Remember to use back-substitution and not the extended Euclidean algorithm.

Problem 3.

- (a) Show that if n is positive integer of the form $4k + 3$ for some integer k , then n is not a perfect square. (Hint: Suppose $n = m^2$. We can then write $m = 4q + r$ for some $r \in \{0, 1, 2, 3\}$. Consider the remainders of the quantities $(4q)^2$, $(4q+1)^2$, $(4q+2)^2$, and $(4q+3)^2$ upon division by 4.)
- (b) Show that no integer in the sequence

$$11, \quad 111, \quad 1111, \quad 11111, \quad \dots$$

is a perfect square.