Discrete Structures. CSCI-150. Fall 2013.

Homework 7. Due Wed. Oct 30, 2013.

Problem 1

Write out, how Euclid's algorithm computes:

(a) $\gcd(287, 120)$

(b) $\gcd(192, 33)$

(c) $\gcd(89, 144)$

Problem 2

For $a, b \in \mathbb{Z}$, prove that if $a \mid b$ and $b \mid a$ then $a = b$ or $a = -b$.

Problem 3

For positive $a, b \in \mathbb{Z}$, prove that if $a \mid b$ and $a \mid (b + 2)$ then $a = 1$ or $a = 2$.

Problem 4

For positive $n \in \mathbb{Z}$, prove that if n is odd then $8 \mid (n^2 - 1)$.

Hint: First, prove that $k(k + 1)$ is even for any integer k.

Problem 5

For positive $a, b, c \in \mathbb{Z}$, prove that if $c = \gcd(a, b)$ then $c^2 \mid ab$.