Math 4362 - Number Theory
Homework 2
Due in Class - Thursday 13 September 2018

1. Use the Euclidean Algorithm to find $\gcd(a,b)$, and to obtain integers x and y such that $\gcd(a,b) = ax + by$, in the following cases:

   (a) $a = 56$, $b = 72$.

   (b) $a = 24$, $b = 138$.

   (c) $a = 119$, $b = 272$.

   (d) $a = 1769$, $b = 2378$.

2. Let a and b be non-zero integers. When is $\gcd(a,b) = \operatorname{lcm}(a,b)$?

3. Determine all solutions in the integers of the following Diophantine equations

   (a) $24x + 138y = 18$

   (b) $14x + 35y = 93$

   (c) $54x + 21y = 906$

   (d) $158x - 57y = 7$

4. A man has \$4.55 in change composed entirely of dimes and quarters. What are the maximum and minimum number of coins that he can have? Is it possible for the number of dimes to equal the number of quarters?