CISC-102 FALL 2017

HOMEWORK 6

Assignments will **not** be collected for grading.

Readings

Read sections 11.6 of *Schaum's Outline of Discrete Mathematics*.

Read section 6.6 (Don't worry if the theorems of this section seem daunting. The first 3 pages of the section do give a good explanation of gcd, and lcm.) of *Discrete Mathematics Elementary and Beyond*.

Problems

(1) Let $a, b \in \mathbb{R}$. Prove $(ab)^n = a^n b^n$, for all $n \in \mathbb{N}$. Hint: Use induction on the exponent n.

(2) Let a = 1763, and b = 42
   (a) Find $\gcd(a, b)$. Show the steps used by Euclid's algorithm to find $\gcd(a, b)$.
   (b) Find integers x, y such that $\gcd(a, b) = ax + by$
   (c) Find lcm(a,b)

(3) Prove $\gcd(a, a + k)$ divides k.

(4) If a and b are relatively prime, that is $\gcd(a, b) = 1$ then we can always find integers x, y such that $1 = ax+by$. This fact will be useful to prove the following proposition.

   Suppose p is a prime such that $p|ab$, that is p divides the product ab, then $p|a$ or $p|b$.