Math 220 – Homework 12

Due Monday 05/02 at the beginning of class

PART A

Problems from the textbook:

- Section 5.3 # 1b, 6, 10(c), 11, 12, 13, 15

PART B

1. Let $a, b, c \in \mathbf{Z}$. Determine the truth or falsehood of the following statements.
   (a) $\gcd(a, 0) = a$.
   (b) Let a and b be not both zero. Then $\gcd(a, b) = \gcd(-a, b)$.
   (c) The set $\mathbf{Z}$ of integers is closed with respect to subtraction.
   (d) The set $\mathbf{Z} - \mathbf{Z}^+$ of integers is closed with respect to multiplication.
   (e) The Well Ordering Principle implies that the set $\mathbf{E}$ of even integers contains a least element.
   (f) If $a|c$ and $b|c$, then $ab|c$.
   (g) If $a|b$ and $b|a$ then $a = b$.
   (h) $\gcd(a, b) = gcd(-a, |b|)$.
   (i) If $a|b$ then $a \leq b$.
   (j) $2|ab(a + b)$.
   (k) Let $a, b \in \mathbf{Z}^+$ and let $\gcd(a, b) = 2016$. Then $\gcd(\frac{a}{2016}, \frac{b}{2016}) = 1$.
2. (a) Use the Euclidean Algorithm to determine $\gcd(374, 946)$.
   (b) Find integers x and y such that $374x + 946y = \gcd(374, 946)$.
3. Find integers x and y such that $1313x + 507y = \gcd(1313, 507)$.