

Math 220 – Homework 12

Due Thursday 04/27 at the beginning of class

Total points=184

PART A

Problems from the textbook:

Section 5.1 # 17 , 18 , 23 **Section 5.2** # 18 , 22 **Section 5.3** # 1b , 6 , 10(c) , 11 , 12 , 13 , 15 **PART B**

1. Let $f \in F(A, B)$. Prove that if $X \subseteq A$ and $Y \subseteq A$ then $f(X \cup Y) = f(X) \cup f(Y)$.
2. 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 Well Ordering Principle implies that the set \mathbf{E} of even integers contains a least element.
 - (d) $\gcd(a, b) = \gcd(-a, |b|)$.
 - (e) If $a|b$ then $a \leq b$.
 - (f) $2|ab(a + b)$.
 - (g) Let $a, b \in \mathbf{Z}^+$ and let $\gcd(a, b) = 2018$. Then $\gcd(\frac{a}{2018}, \frac{b}{2018}) = 1$.
3. (a) Use the Euclidean Algorithm to determine $\gcd(374, 946)$.
(b) Find integers x and y such that $374x + 946y = \gcd(374, 946)$.
4. Find integers x and y such that $1313x + 507y = \gcd(1313, 507)$.