

**Math 220 – Homework 11**

Due Thursday 04/20 at the beginning of class

Total points=96

**PART A**

Problems from the textbook:

**Section 3.1** # 3(a,b) 12pts, 8 20pts, 17 12pts, 20 10pts**Section 3.2** # 21 10pts (compare this to #21 in section 3.2)**PART B**

1. 10pts Let  $f \in F(A, B)$ . Prove that if  $X \subseteq A$  and  $Y \subseteq A$  then  $f(X \cap Y) = f(X) \cap f(Y)$ .
2. 10pts Let  $f : \mathbb{R} \rightarrow \mathbb{R}$  be defined by  $f(x) = 2016 - 4x$ . Compute  $f([-4, 1])$ . (Give a formal proof.)
3. 12pts For each of the following functions write out  $f(X)$  and  $f^{-1}(W)$  for the given sets  $X$  and  $W$ , where  $f : \mathbb{Z} \rightarrow \mathbb{Z}$ . (No proofs are necessary.)

(a)

$$f(n) = \begin{cases} n + 1 & \text{if } n \in \mathbb{E} \\ n & \text{if } n \in \mathbb{O} \end{cases}, \quad X = \{0, 1, 5, 9\}, \quad W = \mathbb{O}.$$

(b)  $f(n) = n^2$ ,  $X = \{-2, -1, 0, 1, 2\}$ ,  $W = \{2, 7, 11\}$