**ECS20**

**Homework 4**

***Proofs:***

**Exercise 1:**

Give a direct proof, an indirect proof, and a proof by contradiction of the statement: « if n is even, then n+4 is even ».

***Set Theory:***

**Exercise 2:**

Let A, B and C be sets. Show that (A-B)-C = (A-C) - (B-C)

*The symmetric difference of A and B, denoted by , is the set containing those elements in either A or B, but not in both A and B*

**Exercise 3:**

Show that 

**Exercise 4**

1. Show that 
2. Show that 
3. Show that  if A is a non empty set.

**Exercise 5**

Can you conclude that A = B if A, B, and C are sets such that:

a) 

b) 

*The cardinality of a finite set A, denoted as |A|, is the number of elements it contains.*

*There is a nice property on cardinality that we will suppose known:*



**Exercise 6**

Show that if A, B, and C are sets then



**Exercise 7**

Let A and B be subsets of the finite universal set U. Show that:



**Exercise 8**

Let *Ai*={…,-2,-1,0,1,…,i}. Find:

a)

b) 

**Exercise 9**

Let A and B be two sets. Show that if  then 

**Exercise 10**

Let A and B be two sets. Show that if  then 

***\*\*Extra credit:***

1. Let A and B be two sets. Show that , where P means the power set.
2. Give one example of two sets A and B such that 