# A1

## Q2

prove

Lets denote proposition A is a set and B is a Set and : , we need to show   
1. A is a set and B is a Set 2. (definition of subset) 3. ( defination of cardinality) 4. (hypothetical syllogism, by(2) and (3)) 5. (By definition of intersection)  
6. (modus ponens, by (4) and (5))

1. (Principle of inclusion-exclusion)
2. (By (6) and (7))

## Q3

To prove that , we need to find positive constants such that for all

take as 9, when ,

lower bound:  
so , Thus we can take when

upper bound:

when So . We already discussed that when Thus . So we can take for

Thus, there exits positive constants such that for all, Thus .. is O(n^2)

## Q4