

### **Subject 39**

**Please, don't write on the exam paper.**

#### **Exercise 1**

Prove by induction that for any natural number  $n \geq 1$  :

$$1 + 3 + 5 + \dots + (2n - 1) = n^2$$

#### **Exercise 2**

Prove the following statement by contradiction :

For all integers  $n$ , if  $n^2$  is odd then  $n$  is odd.

#### **Exercise 3**

1) What is the contrapositive of : "If it is raining then the grass is wet" ?

2) Prove the following statement using the contrapositive method.

"If  $x$  and  $y$  are two integers whose product is even, then at least one of the two integers must be even."