

## Discrete Structures-2025: Tutorial-3

### Proof-I

- (1) Let  $n$  be a positive integer. Then, prove the following two statements.
- (i)  $n$  is even if and only if  $7n + 4$  is even.
  - (ii)  $n$  is odd if and only if  $5n + 6$  is odd.
- (2) Prove that if  $n^2$  is divisible by 7, then  $n$  is divisible by 7.
- (3) Prove this triangle inequality. If  $x$  and  $y$  are real numbers, then  $|x| + |y| \geq |x + y|$ .
- (4) Prove that every odd integer is the difference of two perfect squares.