# CSC2901 – Discrete Structures

**Tutorial Sheet I**

1. Prove that sum of two odd numbers is an odd number.
2. For a, and b below find m and n such that am+bn = gcd(a,b), if possible.
    a. a = 10, b = 3
    b. a = 25, b = 15
    c. a = 25, b = 9
    d. a = 7, b = 3
    e. a = 21, b=5
    f. a = 9, b = 5
3. What conditions should exist between a and b for m and n to exist s.t am+bn =1?
4. Prove that if $a \equiv b \pmod n$ then $a^2 \equiv b^2 \pmod n$
5. What is the inverse for the given modulo n of
    a. 7(mod 5)
    b. 5(mod 21)
    c. 3(mod 7)
6. Solve the following equation for x, if possible
    a. $7x \equiv 2 \pmod 5$
    b. $8x \equiv 7 \pmod{11}$
7. What is the ciphered text of the following messages using Caesar's method with the key "shift left 2".
    a. I LOVE MATHS
    b. FORTIS ESSE
8. For each pairs of p, and q for Alice below, what is the public key and the private key
    a. 5, 3
    b. 11, 7
    c. 21, 17
9. Bob sends message 'R' to Alice. What is the ciphered text for each of the pairs above?
10. Alice receives the message 'J' from Bob, what is the plaintext for each of the pairs in 8.