10. If a,b,c and d are integers such that a b(mod m) and c d(mod m) ,then prove that a^k b^k (mod m).

(11) Solve $a_{n-2} + 3a_{n+1} + 2a_n = 3^n$, n 0, $a_0 = 0$, $a_1 = 1$.

(12.) Determine GCD(1819, 3587) and write GCD as a linear combination of the two numbers.

13. Solve the linear Diophantine equation 24x + 138y = 18.