

DISCRETE MATHEMATICS, CLASS EXERCISE 7

(1) You use $p = 23, q = 31, s = 13$ to generate your public RSA key: $r = 713, s = 13$. You receive a secret message $E = 5$. Decode the message.

(2) Use strong induction to prove the following property of the Fibonacci numbers.

$$F(n + 3) = 2F(n + 1) + F(n), \quad n \geq 1.$$

(3) Write a pseudocode recursive algorithm for a function to compute $F(n)$, the n 'th Fibonacci number.

(4) The Lucas sequence is defined by $L(1) = 1, L(2) = 3, L(n) = L(n - 1) + L(n - 2)$ for $n \geq 3$.

a) Write the first 10 terms of the sequence.

b) Prove that $L(n) = F(n + 1) + F(n - 1)$ for $n \geq 2$ where $F(n)$ is the Fibonacci sequence.