

Math 192r, Problem Set #3
(due 9/26/01)

1. Let F_n be the n th Fibonacci number, as Wilf indexes them (with $F_0 = F_1 = 1$, $F_2 = 2$, etc.). Give a simple homogeneous linear recurrence relation satisfied by the sequence whose n th term is
 - (a) nF_n ;
 - (b) $1F_1 + 2F_2 + \dots + nF_n$;
 - (c) $nF_1 + (n-1)F_2 + \dots + 2F_{n-1} + F_n$;
 - (d) F_n when n is odd, and 2^n when n is even.

In each case, an explanation should be included.

2. The sequence of polynomials $f_n(x)$ in problem 2 of problem set 1 satisfies a second-order linear recurrence relation with coefficients that are Laurent polynomials in x .
 - (a) Find it, and prove that it is correct. (Note that this proves your conjectures from parts (a) through (c) of that problem.)
 - (b) Express $\sum_{n=0}^{\infty} f_n(x)y^n$ as a rational function of x and y .

Please be sure to write down how many hours you spent working on the assignment, and whom you worked with.