

### Nov 21 Homework

1. If you want a power series  $\sum_{i=0}^{\infty} a_i x^i$  whose coefficients  $a_i$  give the number of unordered partitions of  $i$  which do not include any 2's, and do not include any parts over 4, what series do you multiply?
2. Write out the first 8 terms (up to  $a_7 x^7$ ) in this series. Actually list the  $a_7$  partitions of 7, using only 1's, 3's and 4's.
3. Find the number of ordered partitions (compositions) of  $n = 8$  of  $p$  parts, with no part 1. That is, find the number of solutions to  $x_1 + x_2 + \dots + x_p = 8$ , with  $x_i \geq 2$ . (Hint: substitute  $y_i = x_i - 1$ .) Clearly,  $p$  cannot be more than 4; add up the answers for  $p = 1, 2, 3$  and 4, and verify that it is  $F_{n-1} = F_7$ , as claimed in Schumer problem 15.7.
4. The number of partitions,  $p(n)$ , for the first 10 integers are:

$p(1)$	=	1
$p(2)$	=	2
$p(3)$	=	3
$p(4)$	=	5
$p(5)$	=	7
$p(6)$	=	11
$p(7)$	=	15
$p(8)$	=	22
$p(9)$	=	30
$p(10)$	=	42

List all partitions of  $n$ , for  $n=1$  through 7.