Combinatorics HW Genenating Function and Integer Partition

Student ID: Name: Score:

1. Integer composition: Integer 5 is partitioned into orderly partitions which are made up by numbers 1,2,3,4. Such as (1+1+3, or 1+3+1 or 2+3, 4+1,....) How many different ways are there?
2. Integer partition: How many ways to partition n into several numbers that the order between numbers is ignored. Please write the corresponding generating function.
3. Provide proof that the partition number for integer *n* using **different odd numbers** (ordering is ignored), equals to the partition number of *n* being partitioned into the self-conjugated Ferrers Diagrams.

(1st row exchanged with 1st column, 2nd row exchanged with 2nd column, …, as image is rotated by the dotted line as axis shown in slices; is still Ferrers diagram. 2 Ferrers diagrams are known as a pair of conjugated Ferrers diagrams. The diagram is called self-conjugated if its conjugated diagram is the same with the original diagram.)