Example (4) Using MAPLE find formal products for GFs of
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(i) p(n)
(ii) p(D,n)
(iii) The number of partitions of n in which difference between parts is at least 2,

at least up to q^30.

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> with(combinat):
> read "FUNCS.txt":

# (i)

> GFP:=add(P(n)*q^n,n=0..30);
                                  2      3      4      5      6      7      8      9      10      11
GFP := 1 + q + 2 q  + 3 q  + 5 q  + 7 q  + 11 q  + 15 q  + 22 q  + 30 q  + 42 q   + 56 q

          12        13        14         29        15        16        17        18
     + 77 q   + 101 q   + 135 q   + 4565 q   + 176 q   + 231 q   + 297 q   + 385 q

          28        19        20        21        22        23        24        25
     + 3718 q   + 490 q   + 627 q   + 792 q   + 1002 q   + 1255 q   + 1575 q   + 1958 q

          26        30        27
     + 2436 q   + 5604 q   + 3010 q

> pmake(GFP,q,30);
                                  2        3        4        5        6        7        8        9
1/((1 - q) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q )

          10        11        12        13        14        15        16        17
     (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q )

          18        19        20        21        22        23        24        25
     (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q )

          26        27        28        29        30
     (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ))


# (ii)

> GFPDP:=add(PDP(n)*q^n,n=0..30);
                                  2      3      4      5      6      7      8      9      10      11
GFPDP := 1 + q + q  + 2 q  + 2 q  + 3 q  + 4 q  + 5 q  + 6 q  + 8 q  + 10 q   + 12 q

          12        13        14        29        15        16        17        18        28
     + 15 q   + 18 q   + 22 q   + 256 q   + 27 q   + 32 q   + 38 q   + 46 q   + 222 q

          19        20        21        22        23        24        25        26        30
     + 54 q   + 64 q   + 76 q   + 89 q   + 104 q   + 122 q   + 142 q   + 165 q   + 296 q

          27
     + 192 q

> pmake(GFPDP,q,30);
                                  3        5        7        9        11        13        15        17
1/((1 - q) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q )

          19        21        23        25        27        29
     (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ) (1 - q ))


# (iii)

> GFPRR:=add(PRR(n)*q^n,n=0..30);
                                  2      3      4      5      6      7      8      9      10      11      12
GFPRR := 1 + q + q  + q  + 2 q  + 2 q  + 3 q  + 3 q  + 4 q  + 5 q  + 6 q   + 7 q   + 9 q

          13        14        29        15        16        17        18        28        19
     + 10 q   + 12 q   + 102 q   + 14 q   + 17 q   + 19 q   + 23 q   + 91 q   + 26 q
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