

[O19-084

[> **restart;**

[> **a:=[1,1,2]:for k from 3 to 21 do**
b:=sum(a[i]*a[k+1-i],i=1..k);a:=[op(a),b] od:a;
[1, 1, 2, 5, 14, 42, 132, 429, 1430, 4862, 16796, 58786, 208012, 742900, 2674440, 9694845,
35357670, 129644790, 477638700, 1767263190, 6564120420, 24466267020]

[> **c:=evalf([seq(a[k+1]/a[k],k=1..21)]);**
c := [1., 2., 2.500000000, 2.800000000, 3., 3.142857143, 3.250000000, 3.333333333,
3.400000000, 3.454545455, 3.500000000, 3.538461538, 3.571428571, 3.600000000,
3.625000000, 3.647058824, 3.666666667, 3.684210526, 3.700000000, 3.714285714,
3.727272727]

[> **g:=(1-sqrt(1-4*x))/2/x;**

$$g := \frac{1 - \sqrt{1 - 4x}}{2x}$$

[> **series(g,x=0,23);**

1 + x + 2 x² + 5 x³ + 14 x⁴ + 42 x⁵ + 132 x⁶ + 429 x⁷ + 1430 x⁸ + 4862 x⁹ + 16796 x¹⁰ + 58786
x¹¹ + 208012 x¹² + 742900 x¹³ + 2674440 x¹⁴ + 9694845 x¹⁵ + 35357670 x¹⁶ + 129644790 x¹⁷
+ 477638700 x¹⁸ + 1767263190 x¹⁹ + 6564120420 x²⁰ + 24466267020 x²¹ + O(x²²)

[> **d:=[seq((2*p)!/p!/(p+1)!,p=0..21)];**

d := [1, 1, 2, 5, 14, 42, 132, 429, 1430, 4862, 16796, 58786, 208012, 742900, 2674440,
9694845, 35357670, 129644790, 477638700, 1767263190, 6564120420, 24466267020]

[> **evalf(seq(d[i]*sqrt(Pi)*i*sqrt(i)/4^(i-1),i=5..20));**
1.083722308, 1.068442478, 1.057878960, 1.050140166, 1.044226733, 1.039560978,
1.035785714, 1.032668218, 1.030050361, 1.027820939, 1.025899470, 1.024226269,
1.022756140, 1.021454227, 1.020293222, 1.019251423

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