Exact formulas for Integer Sequences

By Simon Plouffe, march 1993

These formulas are all exact and they were found using the author customized bootstrap method. That method is a variant of what is described in [GKP].
The { } denotes the nearest integer function and [ ] the floor function. They were found in 1993. Annnnnn refers to either [Sloane] or [Sloane,Plouffe].

$A000255(n) = \left\{\frac{(n+2)n!}{\exp(1)}\right\}$, A000255 is the sequence in of [Sloane], [Sloane,Plouffe] is equal to 1,1,3,11,53,309,2119,16687,148329,1468457,16019531…

$A001339(n) = \{\exp(1)nn!\}$, A001339 = 1,3,11,49,261,1631,11743,95901,876809,…

$A001340(n) = \{\exp(1)(n^2+n+1)n!\}$, A001340 = 2,8,38,212,1370,10112,84158,780908…

$A001341(n) = \{\exp(1)(n^3+n-1)n!\}$, A001341 = 6,30,174,1158,8742,74046,696750, …

$A001342(n) = \{(n^4+6n^3+17n^2+20n-9)\exp(1)n!\}$, A001342 = 24,144,984,7584,65304,…

$A002467(n) = \{1-1/\exp(1))n!\}$, A002467 = 0,1,1,4,15,76,455,3186,25487,229384,…

$A000153(n) = \left\{\frac{(n^2+3n+1)n!}{2\exp(1)}\right\}$, A000153 = 0,1,2,7,32,181,1214,9403,82508, …

$A000522(n) = \{\exp(1)n!\}$, A000522 = 1,2,5,16,65,326,1957,13700,109601, …

$A000166(n) = \left\{\frac{(n-1)!}{2\exp(1)}\right\}$, A000166 = 1,0,1,2,9,44,265,1854,14833,133496, …

$A000354(n) = \{2^n n!\exp(1/2)\}$, A000354 = 1,1,5,29,233,2329,27949,391285, …

$A001540(n) = \{\cosh(1)n!-1\}$, A001540 = 0,2,8,36,184,1110,7776,62216, …

$A000180(n) = \left\{\frac{3^n n!}{\exp(1/3)}\right\}$, A000180 = 1,2,13,116,1393,20894,376093,7897952, …

$$A000266(n) = n!\frac{\left[\dfrac{\left[\frac{n}{2}\right]!\,2^{[\frac{n}{2}]}}{e^{1/2}} + \frac{1}{2}\right]}{2^{[\frac{n}{2}]}\left[\frac{n}{2}\right]!}$$, [A000266](http://www.research.att.com/~njas/sequences/) = 1,1,1,3,15,75,435,3045,24465, …

$$A000090(n) = n!\frac{\left[\dfrac{\left[\frac{n}{3}\right]!\,3^{[\frac{n}{3}]}}{\sqrt{e}} + \frac{1}{2}\right]}{3^{[\frac{n}{3}]}\left[\frac{n}{3}\right]!}$$, A000090 = 1,1,2,4,16,80,520,3640,29120, …

$$A000138(n) = n!\frac{\left[\dfrac{\left[\frac{n}{4}\right]!\,4^{[\frac{n}{4}]}}{e^{1/3}} + \frac{1}{2}\right]}{4^{[\frac{n}{4}]}\left[\frac{n}{4}\right]!}$$, A000138 = 1,1,2,6,18,90,540,3780,31500,…

References :

[AS] Abramowitz, M. and Stegun, I. A. (Eds.). Handbook of Mathematical Functions with Formulas, Graphs, and Mathematical Tables, 9th printing. New York: Dover, 1972.

[GKP] Concrete Mathematics, by Ronald L. Graham, Donald E. Knuth, and Oren Patashnik (Reading, Massachusetts: Addison-Wesley, 1994), xiii+657pp. ISBN 0-201-55802-5.

[Sloane, Plouffe] *The encyclopedia of Integer Sequences*, Academic Press, San Diego 600 pp. 1995.

[Sloane N.J.A.] *The On-Line Encyclopedia of Integer Sequences*. http://www.research.att.com/~njas/sequences/.