

Pensieve header: A riddle via Jacob Tsimerman from <https://fivethirtyeight.com/features/can-you-make-24/>

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In[ ]:= T[n_] := T[n, 0];
T[0, j_] = 1;
T[n_, 0] := 1 + Sum[T[k - 1, n - k], {k, n}];
T[n_, j_] := T[n, j] = 1 + Sum[T[k - 1, n - k + j], {k, n}] + j T[n - 1, j];

In[ ]:= T[0]
Out[ ]:= 1

In[ ]:= Table[T[n], {n, 20}]
Out[ ]:= {2, 4, 9, 23, 66, 210, 733, 2781, 11378, 49864, 232769, 1151915, 6018786, 33087206,
190780213, 1150653921, 7241710930, 47454745804, 323154696185, 2282779990495}

In[ ]:= Table[T[n], {n, 20}] // FindSequenceFunction
Out[ ]:= FindSequenceFunction[
{2, 4, 9, 23, 66, 210, 733, 2781, 11378, 49864, 232769, 1151915, 6018786, 33087206,
190780213, 1150653921, 7241710930, 47454745804, 323154696185, 2282779990495}]

In[ ]:= Ts[n_] := Sum[(n - k + 1)^k, {k, 0, n}]
In[ ]:= Table[Ts[n], {n, 1, 10}]
Out[ ]:= {2, 4, 9, 23, 66, 210, 733, 2781, 11378, 49864}

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