

# SUMS OF POWERS OF DIVISORS IN TERMS OF CONVOLUTIONS

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The number  $\sigma_{k-1}(n)$  is defined to be the sum of the  $(k-1)$ st powers of the positive divisors of  $n$  if  $n > 0$ . We follow the Ramanujan convention that

$$\sigma_{k-1}(0) = \frac{1}{2}\zeta(1-k) = -\frac{B_k}{2k}.$$

All powers are taken as repeated convolution, not pointwise exponentiation. As an aside, note that the (maximum) denominator of the fractions on the right hand side of the formula for  $\sigma_{k-1}(n)$  is exactly the product over all primes  $p$  such that  $p-1$  divides  $k$  and  $p \neq 2, 3, 5$ , or  $7$ . This is an easy consequence of the von Staudt-Clausen theorem. This document was (mostly) automatically generated.

$$\sigma_7(n) = 120\sigma_3^2(n)$$

$$\sigma_9(n) = \frac{5040}{11}(\sigma_3 * \sigma_5)(n)$$

$$\sigma_{11}(n) = \frac{1209600}{13}\sigma_3^3(n) + \frac{12600}{13}\sigma_5^2(n)$$

$$\sigma_{13}(n) = 1209600(\sigma_3^2 * \sigma_5)(n)$$

$$\sigma_{15}(n) = \frac{5588352000}{17}\sigma_3^4(n) + \frac{127008000}{17}(\sigma_3 * \sigma_5^2)(n)$$

$$\sigma_{17}(n) = \frac{176795136000}{19}(\sigma_3^3 * \sigma_5)(n) + \frac{465696000}{19}\sigma_5^3(n)$$

$$\sigma_{19}(n) = 3218890752000\sigma_3^5(n) + \frac{1478373120000}{11}(\sigma_3^2 * \sigma_5^2)(n)$$

$$\sigma_{21}(n) = \frac{3984108871680000}{23}(\sigma_3^4 * \sigma_5)(n) + \frac{26244933120000}{23}(\sigma_3 * \sigma_5^3)(n)$$

$$\sigma_{23}(n) = \frac{941847434035200000}{13}\sigma_3^6(n) + \frac{61451550720000000}{13}(\sigma_3^3 * \sigma_5^2)(n) + \frac{65836374912000}{13}\sigma_5^4(n)$$

$$\sigma_{25}(n) = 6570399802982400000(\sigma_3^5 * \sigma_5)(n) + 81423304704000000(\sigma_3^2 * \sigma_5^3)(n)$$

$$\begin{aligned} \sigma_{27}(n) &= \frac{93581961045737472000000}{29}\sigma_3^7(n) + \frac{8805607783096320000000}{29}(\sigma_3^4 * \sigma_5^2)(n) \\ &+ \frac{25516066518835200000}{29}(\sigma_3 * \sigma_5^4)(n) \end{aligned}$$

$$\begin{aligned} \sigma_{29}(n) &= \frac{14173004548050518016000000}{31}(\sigma_3^6 * \sigma_5)(n) \\ &+ \frac{3094843030566174720000000}{341}(\sigma_3^3 * \sigma_5^3)(n) + \frac{152635051595980800000}{31}\sigma_5^5(n) \end{aligned}$$

$$\sigma_{31}(n) = \frac{4382443235771885813760000000}{17}\sigma_3^8(n) + \frac{560849566106206863360000000}{17}(\sigma_3^5 * \sigma_5^2)(n) \\ + \frac{3137814938550362112000000}{17}(\sigma_3^2 * \sigma_5^4)(n)$$

$$\sigma_{33}(n) = 53825654315176993751040000000(\sigma_3^7 * \sigma_5)(n) \\ + 1562678271218869862400000000(\sigma_3^4 * \sigma_5^3)(n) + 2421955223820582912000000(\sigma_3 * \sigma_5^5)(n)$$

$$\sigma_{35}(n) = \frac{16482237732963107585025638400000000}{481}\sigma_3^9(n) + \frac{52298502355218440352065126400000000}{9139}(\sigma_3^6 * \sigma_5^2)(n) \\ + \frac{4775728054701263818810982400000000}{9139}(\sigma_3^3 * \sigma_5^4)(n) + \frac{1494898231957837004390400000000}{9139}\sigma_5^6(n)$$

$$\sigma_{37}(n) = 10086731229659352410986905600000000(\sigma_3^8 * \sigma_5)(n) \\ + 4025914609851361731280896000000000(\sigma_3^5 * \sigma_5^3)(n) + 12325492790110424648908800000000(\sigma_3^2 * \sigma_5^5)(n)$$

$$\sigma_{39}(n) = \frac{293366538807154632408776992358400000000}{41}\sigma_3^{10}(n) \\ + \frac{61939227384574533455491104768000000000}{41}(\sigma_3^7 * \sigma_5^2)(n) \\ + \frac{92120475567773355504106733568000000000}{451}(\sigma_3^4 * \sigma_5^4)(n) \\ + \frac{7801119578128359963820032000000000}{41}(\sigma_3 * \sigma_5^6)(n)$$

$$\sigma_{41}(n) = \frac{1232471081273765818878328433541120000000000}{43}(\sigma_3^9 * \sigma_5)(n) \\ + \frac{64705579236745046569999065415680000000000}{43}(\sigma_3^6 * \sigma_5^3)(n) \\ + \frac{328378610143140196053691662336000000000}{43}(\sigma_3^3 * \sigma_5^5)(n) + \frac{64729788745277578493362176000000000}{43}\sigma_5^7(n)$$

$$\sigma_{43}(n) = 2241758989362828325870748471132160000000000\sigma_3^{11}(n) \\ + \frac{13425432243609180966718315010457600000000000}{23}(\sigma_3^8 * \sigma_5^2)(n) \\ + \frac{2518543683387354079118142732238848000000000}{23}(\sigma_3^5 * \sigma_5^4)(n) \\ + \frac{4725909714572956664590990049280000000000}{23}(\sigma_3^2 * \sigma_5^6)(n)$$

$$\sigma_{45}(n) = \frac{55808326520683079407938256906192158720000000000}{47}(\sigma_3^{10} * \sigma_5)(n) \\ + \frac{37276090507576125157346975567314944000000000000}{47}(\sigma_3^7 * \sigma_5^3)(n) \\ + \frac{2831151333395645527257484323559833600000000000}{47}(\sigma_3^4 * \sigma_5^5)(n) \\ + \frac{171443912344500003709351955005440000000000}{47}(\sigma_3 * \sigma_5^7)(n)$$

$$\begin{aligned}
\sigma_{47}(n) &= \frac{224338249251386898773036694841672807219200000000000}{221} \sigma_3^{12}(n) \\
&+ \frac{7060976302539367188898876614339094118400000000000}{221} (\sigma_3^9 * \sigma_5^2)(n) \\
&+ \frac{1754633713039220989879268549035126947840000000000}{221} (\sigma_3^6 * \sigma_5^4)(n) \\
&+ \frac{5530166646718770315934842736764518400000000000}{221} (\sigma_3^3 * \sigma_5^6)(n) \\
&+ \frac{430075021826510828857650170953728000000000}{13} \sigma_5^8(n) \\
\sigma_{49}(n) &= 69423639924092568094043732224344997232640000000000 (\sigma_3^{11} * \sigma_5)(n) \\
&+ 5747638762476989489627445893929736601600000000000 (\sigma_3^8 * \sigma_5^3)(n) \\
&+ \frac{6716255772764240634282333587914138583040000000000}{11} (\sigma_3^5 * \sigma_5^5)(n) \\
&+ 75738601148590314663857096585379840000000000 (\sigma_3^2 * \sigma_5^7)(n) \\
\sigma_{51}(n) &= \frac{3413229661379055845346202659667942315760025600000000000}{53} \sigma_3^{13}(n) \\
&+ \frac{1277323624557504958723261396375736921201049600000000000}{53} (\sigma_3^{10} * \sigma_5^2)(n) \\
&+ \frac{406079849978627359294343583446398845478502400000000000}{53} (\sigma_3^7 * \sigma_5^4)(n) \\
&+ \frac{193347013624661380665103844065642178150400000000000}{53} (\sigma_3^4 * \sigma_5^6)(n) \\
&+ \frac{805573715688585553813583107166903992320000000000}{53} (\sigma_3 * \sigma_5^8)(n) \\
\sigma_{53}(n) &= 55738036926810249052915322668637285200271769600000000000 (\sigma_3^{12} * \sigma_5)(n) \\
&+ \frac{10642510222262013284970721834759865064279244800000000000}{19} (\sigma_3^9 * \sigma_5^3)(n) \\
&+ \frac{1506951918082790733653713768462294168570429440000000000}{19} (\sigma_3^6 * \sigma_5^5)(n) \\
&+ \frac{3175785760571933800559316290118018190540800000000000}{19} (\sigma_3^3 * \sigma_5^7)(n) \\
&+ \frac{2953504844562694700602485086036227522560000000000}{19} \sigma_5^9(n) \\
\sigma_{55}(n) &= \frac{161705366617589262994882493720752547749425473126400000000000}{29} \sigma_3^{14}(n) \\
&+ \frac{70960066064237886056656554682075455355868518809600000000000}{29} (\sigma_3^{11} * \sigma_5^2)(n) \\
&+ \frac{28089557046443085464193334317215253829680050995200000000000}{29} (\sigma_3^8 * \sigma_5^4)(n) \\
&+ \frac{188396606555004988649963936340158646043489075200000000000}{29} (\sigma_3^5 * \sigma_5^6)(n) \\
&+ \frac{1631324394505870042932831424524181059089203200000000000}{29} (\sigma_3^2 * \sigma_5^8)(n)
\end{aligned}$$

$$\begin{aligned}
\sigma_{57}(n) = & \frac{3542079999039281956744753730558675088367255075946496000000000000}{59} (\sigma_3^{13} * \sigma_5)(n) \\
& + \frac{424701768828334450044489081406736027204948135510016000000000000}{59} (\sigma_3^{10} * \sigma_5^3)(n) \\
& + \frac{77321615699744241555594269316725203963078735036416000000000000}{59} (\sigma_3^7 * \sigma_5^5)(n) \\
& + \frac{24821453865427524413847524474576413195109400576000000000000}{59} (\sigma_3^4 * \sigma_5^7)(n) \\
& + \frac{742901324386950563772361286591355145383051264000000000000}{59} (\sigma_3 * \sigma_5^9)(n)
\end{aligned}$$

$$\begin{aligned}
\sigma_{59}(n) = & \frac{51090909276669182346981923074849994772067394273371226112000000000000}{793} \sigma_3^{15}(n) \\
& + \frac{80542658555492279075535576916587666577640628775966212096000000000000}{24583} (\sigma_3^{12} * \sigma_5^2)(n) \\
& + \frac{38846180136863086844101762185333074712070125724234678272000000000000}{24583} (\sigma_3^9 * \sigma_5^4)(n) \\
& + \frac{3841565876955552398998058849595162458010851329544552448000000000000}{270413} (\sigma_3^6 * \sigma_5^6)(n) \\
& + \frac{5189077448755030486556223808189655783360643301638144000000000000}{24583} (\sigma_3^3 * \sigma_5^8)(n) \\
& + \frac{352407232361675877505607808081236649974226223104000000000000}{24583} \sigma_5^{10}(n)
\end{aligned}$$

$$\begin{aligned}
\sigma_{61}(n) = & 8502218561239576907452502960245540431386704445718921216000000000000 (\sigma_3^{14} * \sigma_5)(n) \\
& + 1198941244083650356527179343987954437585908908586696704000000000000 (\sigma_3^{11} * \sigma_5^3)(n) \\
& + 272908910785154301572819145152980740900594882441117696000000000000 (\sigma_3^8 * \sigma_5^5)(n) \\
& + 1241961250035000148231046547705603721268285581295616000000000000 (\sigma_3^5 * \sigma_5^7)(n) \\
& + 7822798972215566631013234980475733295743908184064000000000000 (\sigma_3^2 * \sigma_5^9)(n)
\end{aligned}$$

$$\begin{aligned}
\sigma_{63}(n) = & \frac{16562802158075511193575664772309404069073124172388565516288000000000000}{17} \sigma_3^{16}(n) \\
& + \frac{9662107731705096578221247115808605294776490700685464043520000000000000}{17} (\sigma_3^{13} * \sigma_5^2)(n) \\
& + \frac{5577763936837072738724530704587206589057727138546446027980800000000000}{17} (\sigma_3^{10} * \sigma_5^4)(n) \\
& + \frac{64767006906410934198456595486649254447306880066839904256000000000000}{17} (\sigma_3^7 * \sigma_5^6)(n) \\
& + \frac{1476758276572728731586075000197678638156348060040429568000000000000}{17} (\sigma_3^4 * \sigma_5^8)(n) \\
& + 19321949321733377169593989581098613561138522095616000000000000 (\sigma_3 * \sigma_5^{10})(n)
\end{aligned}$$

$$\begin{aligned} \sigma_{65}(n) = & \frac{10422838448139803623169017427040531794525896338795845638737100800000000000000}{67} (\sigma_3^{15} * \sigma_5)(n) \\ & + \frac{392750593343025261078034752410359115044636971872850910768005120000000000000000}{1541} (\sigma_3^{12} * \sigma_5^3)(n) \\ & + \frac{10929956285620105182240351217601645529807260073126556124735078400000000000000}{1541} (\sigma_3^9 * \sigma_5^5)(n) \\ & + \frac{67010251913334810729623276328074440335610887553671585438105600000000000000}{1541} (\sigma_3^6 * \sigma_5^7)(n) \\ & + \frac{730697011806283166209599679116486483873244674985962346905600000000000000}{1541} (\sigma_3^3 * \sigma_5^9)(n) \\ & + \frac{1623745262811163357080383691321914388342855792014131200000000000000}{67} \sigma_5^{11}(n) \end{aligned}$$

$$\begin{aligned} \sigma_{67}(n) = & 189582429733287622987584597974690601240375517992088060746006528000000000000000 \sigma_3^{17}(n) \\ & + 125750908324189387385168044016352218146884362349514771283312640000000000000000 (\sigma_3^{14} * \sigma_5^2)(n) \\ & + 85608842648026536747386110094928790402054597982188784660250624000000000000000 (\sigma_3^{11} * \sigma_5^4)(n) \\ & + 124749785386594595452347419426999192150085668650534739902464000000000000000 (\sigma_3^8 * \sigma_5^6)(n) \\ & + 4055520890503762643711422491782276216108082869030913709178880000000000000 (\sigma_3^5 * \sigma_5^8)(n) \\ & + 1919370210749485051061175372161831748293983893843659980800000000000000 (\sigma_3^2 * \sigma_5^{10})(n) \end{aligned}$$

$$\begin{aligned} \sigma_{69}(n) = & \frac{257099671621203257655787743272659965650593158525598624335851484610560000000000000000}{71} (\sigma_3^{16} \\ & * \sigma_5)(n) \\ & + \frac{4842660537722902226163916365186904263208971642326245979557157928960000000000000000}{71} (\sigma_3^{13} \\ & * \sigma_5^3)(n) \\ & + \frac{16177694579670086816171952476248531780497775785942456504671891619840000000000000000}{71} (\sigma_3^{10} \\ & * \sigma_5^5)(n) \\ & + \frac{141497047603713877041814074336897112679665584164267174369144340480000000000000000}{781} (\sigma_3^7 \\ & * \sigma_5^7)(n) \\ & + \frac{216674508483111807473312442740010508127920116205327226675134464000000000000000}{71} (\sigma_3^4 * \sigma_5^9)(n) \\ & + \frac{36814926142708620657566921914347189252875978770796915982336000000000000000}{71} (\sigma_3 * \sigma_5^{11})(n) \end{aligned}$$

$$\begin{aligned}
& \sigma_{71}(n) \\
= & \frac{16420316999201884731144675338119183201217305325855690262872525394243747840000000000000000}{35113} \sigma_3^{18}(n) \\
& + \frac{12288357952886190751614886630583320829340186070479336078837607943519600640000000000000000}{35113} \sigma_3^{15}(n) \\
& * \sigma_5^2(n) \\
& + \frac{185102636039089106443208124684290843650105578962293103220417526380846120960000000000000000}{667147} \sigma_3^{12}(n) \\
& * \sigma_5^4(n) \\
& + \frac{3308129627263121755938128865078350325951731446198019685950553469432627200000000000000000}{667147} \sigma_3^9(n) \\
& * \sigma_5^6(n) \\
& + \frac{1455510046470601858086112553523666567840878275766920059466125464410521600000000000000000}{667147} \sigma_3^6(n) \\
& * \sigma_5^8(n) \\
& + \frac{120194551641492783987832695641329388695835715353188388089001253273600000000000000000}{667147} \sigma_3^3 * \sigma_5^{10}(n) \\
& + \frac{4739409884838461846643141043362261892320770785583988335584896614400000000000000000}{667147} \sigma_5^{12}(n) \\
& \sigma_{73}(n) \\
= & 1057766288093277448266619400623022690585468917798515104924377942107095040000000000000000 \sigma_3^{17} \\
& * \sigma_5(n) \\
& + 226982081100672901607262385054272666573436555059419909496577337799475200000000000000000 \sigma_3^{14} \\
& * \sigma_5^3(n) \\
& + 89646082585963087332654861308260175971226184444235963386711405609615360000000000000000 \sigma_3^{11} \\
& * \sigma_5^5(n) \\
& + 89760651607785214479565851636940346914541319274708281874023752663040000000000000000 \sigma_3^8 * \sigma_5^7(n) \\
& + 21669270965496118496755827773109126469331452921995943111506033377280000000000000000 \sigma_3^5 * \sigma_5^9(n) \\
& + 791024593682433341191685409829343905360296145017560336569466880000000000000000 \sigma_3^2 * \sigma_5^{11}(n) \\
& \sigma_{75}(n) = 144298914331391475681988835941351158501340119438968593532958305841882071040000000000000000 \sigma_3^{19}(n) \\
& + 120999975918129958475548153473530906923740433640337427402473733336344821760000000000000000 \sigma_3^{16} \\
& * \sigma_5^2(n) \\
& + 110515061447246784382259818357384724076810441236810110783334115795932282880000000000000000 \sigma_3^{13} \\
& * \sigma_5^4(n) \\
& + 23773297224239197915542310249690368838931401389888022153921596492664012800000000000000000 \sigma_3^{10} \\
& * \sigma_5^6(n) \\
& + 1361679958106089403831811049631870799869962790019834477618723661912473600000000000000000 \sigma_3^7 * \sigma_5^8(n) \\
& + 174741919201614166562977084911597557834559570306629218026919664025600000000000000000 \sigma_3^4 * \sigma_5^{10}(n) \\
& + 2320130286387689709540644776167160962293603339291242965297738547200000000000000000 \sigma_3 * \sigma_5^{12}(n)
\end{aligned}$$

$$\begin{aligned} \sigma_{77}(n) = & \frac{30260640754501823777519889927759485369187741095849705244437152528114070574858240000000000000000}{79} (\sigma_3^{18} \\ & + \frac{7338820961192951603597139935909629055957949122568192711682903833416822937354240000000000000000}{79} (\sigma_3^{15} * \sigma_5)(n) \\ & + \frac{3382746457306578624568089784579578791477134253810200134707780611940068947394560000000000000000}{79} (\sigma_3^{12} * \sigma_5^3)(n) \\ & + \frac{4166134217899321566911796614675283305517775441542945728903759496292828446720000000000000000}{79} (\sigma_3^9 * \sigma_5^5)(n) \\ & + \frac{1366906582568128857540651070689470633445961387253452930213454242306829844480000000000000000}{79} (\sigma_3^6 * \sigma_5^7)(n) \\ & + \frac{87680741970122048162291270118477257842659693714165404662458201837404160000000000000000}{79} (\sigma_3^3 * \sigma_5^9)(n) \\ & + \frac{27233846717766549367755099584459290581225278010239612138727961264128000000000000000}{79} (\sigma_5^{11})(n) + \frac{27233846717766549367755099584459290581225278010239612138727961264128000000000000000}{79} \sigma_5^{13}(n) \end{aligned}$$

$$\begin{aligned} \sigma_{79}(n) = & \frac{383639199813742221620187099680588535884898065280168743066039546906650214711049584640000000000000000}{697} \sigma_3^{20} \\ & + \frac{35825247018093559246894872323448605110821431839135782418916912396947168465948508160000000000000000000}{697} (\sigma_3^{17} * \sigma_5^2)(n) \\ & + \frac{373448347544226951472780716715737142045882128722979548318297334655212464160689356800000000000000000}{697} (\sigma_3^{14} * \sigma_5^4)(n) \\ & + \frac{95194988113432206741498007408524206505749997724560889670835872152202884920901632000000000000000000}{697} (\sigma_3^{11} * \sigma_5^6)(n) \\ & + \frac{75767132742758726084280714411145534300458289146461539551197141640567216156966912000000000000000000}{7667} (\sigma_3^8 * \sigma_5^8)(n) \\ & + \frac{1272825751535822919267333386536217033839511964266441599183208894462776521523200000000000000000}{697} (\sigma_3^5 * \sigma_5^{10})(n) \\ & + \frac{21542761238896168115510820428958350226634090002589352392727455936114851840000000000000000}{41} (\sigma_3^2 * \sigma_5^{12})(n) \end{aligned}$$





$$\begin{aligned}
 \sigma_{85}(n) = & 91694646409012731957834879885075281488886897665499497159176709277981899086747332782325760000000000000000 \\
 & * \sigma_5(n) \\
 + & 27829707540040894412099402506079810176707147144278688405203823853794398281382425421414400000000000000000000 \\
 & * \sigma_5^3(n) \\
 + & 169274797663061678457782120977019889630243557598604026853638181092106618549846164268646400000000000000000000 \\
 & * \sigma_5^5(n) \\
 + & 2987376312344161901391235039830087541914575757109429852173582473126618347202129009049600000000000000000000 \\
 & * \sigma_5^7(n) \\
 + & 162223112032717780856487082604983095648053538164981529797915603371680966236915839795200000000000000000000 \\
 & * \sigma_5^9(n) \\
 + & 235138687295339558777210416410152988497581892705618377046553445219299579453977395200000000000000000000 \\
 & * \sigma_5^{11}(n) \\
 + & 5430650822201523864105204067058986405637866872079661265534580700129980204449792000000000000000000000 \\
 & * \sigma_5^{13}(n)
 \end{aligned}$$

$$\begin{aligned}
 \sigma_{87}(n) = & \frac{129141348796656903842088005644881871486181465025016907076933883652841781945412536459421810688000000000000}{89} \\
 + & \frac{147189175177621866665432067872852980275159988208172468509267284828685770173762311740006072320000000000000000}{89} * \sigma_5^2(n) \\
 + & \frac{44894060775343101725666186169976155021103659256760421186635365296090815256160830718554050396160000000000000000}{2047} * \sigma_5^4(n) \\
 + & \frac{1547508444105160714333984582025497760543264093026455085813858520805193123472647157561111347200000000000000000}{2047} * \sigma_5^6(n) \\
 + & \frac{1670203186972991528905298257349997554704540068737179488065252824958146847252489967823182888960000000000000000}{2047} * \sigma_5^8(n) \\
 + & \frac{5518498247747252715662878861768117042584239371718330464200592955714182887186626010886963200000000000000000000}{2047} * \sigma_5^{10}(n) \\
 + & \frac{44089760861461777180990981918681347913910215853054618366560398899118100103537818494566400000000000000000000}{2047} * \sigma_5^{12}(n) \\
 + & \frac{164147152406835969707860517817417841558718693676268396857570217713034178700981043200000000000000000000}{89} * \sigma_5^{14}(n)
 \end{aligned}$$

$$\begin{aligned}
\sigma_{89}(n) = & 59481175724811024958143348516179189908790871146409899176528942584862502205718027922580323696640000000000 \\
& + \frac{620577245334640248433837230291232964781599817179456764225048611332823586294515556591955292979200000000000000}{31} * \sigma_5(n) \\
& + \frac{813077196017169575079318671900924973137643096457401828104179814037600397891427818193401405243392000000000000}{589} * \sigma_5^3(n) \\
& + \frac{168126495110533085345249643314188562284491907754605777193106488180812358344127550699851061657600000000000000}{589} * \sigma_5^5(n) \\
& + \frac{1241690482794276161941815613107973963011616186432053987467262667371454149114768288249281721139200000000000000}{6479} * \sigma_5^7(n) \\
& + \frac{22402323318161690178875159272665960261530644553757321675706944218418959209563508681086074880000000000000000}{589} * \sigma_5^9(n) \\
& + \frac{920248006557177014353902505278474581304066066762091458310983685570773380672043571426099200000000000000000}{589} * \sigma_5^{11}(n) \\
& + \frac{18656382914190710483277311190003938700811288956179010900513679051818200218970829619200000000000000000}{589} * \sigma_5^{13}(n) \\
& + \frac{\phantom{18656382914190710483277311190003938700811288956179010900513679051818200218970829619200000000000000000}}{\phantom{589}} * \sigma_5^{15}(n) \\
\sigma_{91}(n) = & 98453920630223178887063657877809070604841927925575717227469809766056257995369912265861697319731200000000 \\
& + \frac{578596732504398346343942360688012061276576818586230794081742355649763880191806154307001870073200640000000000}{47} \\
& + \frac{856768304705385359569071689385705227481273374231370597598988819851998400973885109517534059477073920000000000}{47} * \sigma_5^2(n) \\
& + \frac{338170498941029178593406572247707471933804461442686243801830076050039786487548503719309303873536000000000000}{47} * \sigma_5^4(n) \\
& + \frac{434313426243790861585074578897940864430580215595976995011486962552585458247245187136092245065728000000000000}{47} * \sigma_5^6(n) \\
& + \frac{182301929056472750079764547904134763910434564262567293966029602865411056754538835921369825280000000000000000}{47} * \sigma_5^8(n) \\
& + \frac{2114826279225612187225797750679360781982743490879912303814804410042617100971653432748990791680000000000000000}{47} * \sigma_5^{10}(n) \\
& + \frac{398202151105864630108055299621161104008342573790316056746603784648476138765668900981964800000000000000000000}{47} * \sigma_5^{12}(n) \\
& + \frac{\phantom{398202151105864630108055299621161104008342573790316056746603784648476138765668900981964800000000000000000000}}{\phantom{47}} * \sigma_5^{14}(n)
\end{aligned}$$

$$\begin{aligned}
 \sigma_{93}(n) = & 46049051534460319697214534995840813158439911603143704978525823449806298559000671556758920810683432960000 \\
 & * \sigma_5(n) \\
 + & 170984182053205340004617438917464587809392506532066734925932808323855302272152237321913242059014144000000000 \\
 & * \sigma_5^3(n) \\
 + & 132685918430765612050069972870458310501403910804349830710062668823676222444620678835367992083297075200000000 \\
 & * \sigma_5^5(n) \\
 + & 31778494476671500336114583287364541024810671117643285479537978391985547672571855959534467987537920000000000 \\
 & * \sigma_5^7(n) \\
 + & 25860868620335504431371617702171175172700525456133866704234363537951072550899728584964067232317440000000000 \\
 & * \sigma_5^9(n) \\
 + & 67461721318126009907613716007527771887488420886689962174234518364997116326527142490528337100800000000000000 \\
 & * \sigma_5^{11}(n) \\
 + & 437108797166073672089374596428314458993859238815681373783916936150811053789053065897307013120000000000000000 \\
 & * \sigma_5^{13}(n) \\
 + & 3073564929732890263605240809491842975937952239336928773563321164468743228741176659017728000000000000000000 \\
 & * \sigma_5^{15}(n)
 \end{aligned}$$

$$\begin{aligned}
 \sigma_{95}(n) = & \frac{17057696439150708924548856890967315617347922927278025948771662331461636491617681917782783272937113687949}{21437} \\
 + & \frac{233032162286605021274462719191151143908682152686308368514300227499243659452550101420145510553672842351738880}{21437} * \sigma_5^2(n) \\
 + & \frac{383090038767442920351210278491989391542617212858683875440359903493926340201268096111735663397675121476894720}{21437} * \sigma_5^4(n) \\
 + & \frac{171667276374277176053900824247708341561809530139611017955274578340664584300654134938197930005571073946419200}{21437} * \sigma_5^6(n) \\
 + & \frac{258781530759127514761409535182826213086234131918063888095483163649845094787679290965409760429108988215296000}{21437} * \sigma_5^8(n) \\
 + & \frac{134615619246216137800147923198425697724765442021653504399981340703021099105789806930630992860568092672000000}{21437} * \sigma_5^{10}(n) \\
 + & \frac{214519281719333046877362639591805100628884933846713703692245977519747516567437887422829898676557578240000000}{21437} * \sigma_5^{12}(n) \\
 + & \frac{42482453249718788205455595213964448208559533634629605947295751172214390651900763904000722468864000000000000}{1261} * \sigma_5^{14}(n) \\
 + & \frac{71049313009039096132266692679988107288283828446187629776594344786349755506974927597197275955200000000000000}{1261}
 \end{aligned}$$



$$\begin{aligned}
 \sigma_{101}(n) = & \frac{4692556921399412083356102048564953534869495447901419496479983690630050793802749623482513697318563234476}{103} \\
 & * \sigma_5(n) \\
 + & \frac{209257181366527939300724014916337240591424141103888719156385213692410338293254625271437319687214240787524162}{103} \\
 & * \sigma_5^3(n) \\
 + & \frac{201770935745131710364135021830460342122600157918090804062714126537240037829451471286013140772048738462554732}{103} \\
 & * \sigma_5^5(n) \\
 + & \frac{629996765689391075799556101609394942308583657145984203976135735859717716414846343034245879136673704273474328}{103} \\
 & * \sigma_5^7(n) \\
 + & \frac{718629238862337274135285020821521500326528210651285868827740101601180797440651264104758259820279958761480650}{103} \\
 & * \sigma_5^9(n) \\
 + & \frac{296534669507343942377096979442959748060526036157075227652695727586175959449893428986771238583000508603039744}{103} \\
 & * \sigma_5^{11}(n) \\
 + & \frac{385816094094262286122112439435027361930579219513807022358798318785744987732220429056125680331523142545571840}{103} \\
 & * \sigma_5^{13}(n) \\
 + & \frac{107844237399801108062724642602479081545537348527301981411145693994471373773198186219361863916298489036800000}{103} \\
 & * \sigma_5^{15}(n) \\
 + & \frac{150533840003905292100270070195940138534742739361728920784800447074909202995989482118424950706326732800000000}{103}
 \end{aligned}$$

$$\begin{aligned}
\sigma_{103}(n) = & \frac{4523738557529434335657682902333923464938235397350992275081595016850670273148944972321584854024615913779}{53} \\
& + \frac{729675253933932466458865750104758061087100284900230391102209264608653426134345192902185140440717077616664421}{53} \\
& \qquad \qquad \qquad * \sigma_5^2(n) \\
& + \frac{145631901381501975273630073058554079287081630490623474960866931252940220406402439777365908401345477413351243}{53} \\
& \qquad \qquad \qquad * \sigma_5^4(n) \\
& + \frac{823030582453561498914884588997861852484274716749199563786466156798090541896399681789151439093904503633047620}{53} \\
& \qquad \qquad \qquad * \sigma_5^6(n) \\
& + \frac{165286464532212021006970734182487043197979060155544702174708316820337753826871939399214853417551999401416782}{53} \\
& \qquad \qquad \qquad * \sigma_5^8(n) \\
& + \frac{124718313715165253741349038181787494085454995932371065745945235012328970407446201492753212414192586812549895}{53} \\
& \qquad \qquad \qquad * \sigma_5^{10}(n) \\
& + \frac{334429729437897073224248847279417847131304094226480092829946696626359363589387153344952645635991402014532698}{53} \\
& \qquad \qquad \qquad * \sigma_5^{12}(n) \\
& + \frac{260772413832692632827582222301171288687372393360238763043407717053629496273587083611071774816579531573297152}{53} \\
& \qquad \qquad \qquad * \sigma_5^{14}(n) \\
& + \frac{339212411318624904000293867418566935402409690266687194791775134658202075433782424678855018449310073225216000}{53} \\
& \qquad \qquad \qquad * \sigma_5^{16}(n)
\end{aligned}$$

$$\begin{aligned}
 \sigma_{105}(n) = & \frac{6147845630846980675784455821377388813258142551517638972934623908587949901712405428438672418923117791361}{107} \\
 & * \sigma_5(n) \\
 + & \frac{298665269354323668153979088599376563525083749996387851981060813926946694093304080673144335088762491609201368}{107} \\
 & * \sigma_5^3(n) \\
 + & \frac{318377373256067423444812857742412901830912787442098410461533574962878397085007441585374459121966846876556540}{107} \\
 & * \sigma_5^5(n) \\
 + & \frac{112146569189795436781312794926293396517271435865996874849912899890572801689066381588032171505530356466334603}{107} \\
 & * \sigma_5^7(n) \\
 + & \frac{148623051510686021424697558995029549612920363824958867451405037618842294447277802330517310352359752661229691}{107} \\
 & * \sigma_5^9(n) \\
 + & \frac{746256940958256824058874049925167427385493726926598941429218525081340967769066619116729799088960555924545730}{107} \\
 & * \sigma_5^{11}(n) \\
 + & \frac{128308697085579919385935884888010936679544394754830935476534520066910566426323764804356517981360786612388546}{107} \\
 & * \sigma_5^{13}(n) \\
 + & \frac{570252287776520788897677400622426137920886363928470144680207373790249351833535554259673943219083966100694630}{107} \\
 & * \sigma_5^{15}(n) \\
 + & \frac{280152370860398769028723994404547584447358607219834915697524684103158475128050232487709701345267941459886080}{107} \\
 & * \sigma_5^{17}(n)
 \end{aligned}$$

$$\begin{aligned}
\sigma_{107}(n) = & \frac{5862820624916671313823965735486921104078016196711644533641570380413899712281156138462963722051211355783}{52429} \\
& + \frac{102252894834144812725723935813026917893846024197222449620463624725189918158234594321225274150443940678235253}{52429} * \sigma_5^2(n) \\
& + \frac{223380421135477355724352483074619628412935705776409933019258241816258092625256111687687988155304371588527883}{52429} * \sigma_5^4(n) \\
& + \frac{266864566753211907141988991996473300473664333728276821691958335725436958603584450577348123487201731111554833}{996151} * \sigma_5^6(n) \\
& + \frac{610037807798372232090565837757354960196196486618192881424521594461820564669496383540933120933010666883571865}{996151} * \sigma_5^8(n) \\
& + \frac{542047351814385506747903999533668247326124969499883727303172655396519968308544475442776586401993566052719425}{996151} * \sigma_5^{10}(n) \\
& + \frac{180893229481917051112695589053179538138279042393270439667223808839989299330916472317961160564269886931174471}{996151} * \sigma_5^{12}(n) \\
& + \frac{194905390831146201012555092238969453335272235733725930186806061037454241657762173508584262859465362672185661}{996151} * \sigma_5^{14}(n) \\
& + \frac{457503837035776782009395353316300327400608830922063008864771546578365256897372798837379902981393780763680408}{996151} * \sigma_5^{16}(n) \\
& + \frac{538515584803799648261098665679544116609977703093410063248367977506912938029414994537488862409823453325884915}{996151}
\end{aligned}$$



