```
Clear[zeta, zetaytt]
bin[z_, k_] := bin[z, k] = Product[z - j, {j, 0, k - 1}] / k!
zeta[n_, s_, k_] := zeta[n, k] = Sum[j^-s zeta[n - j, s, k - 1], {j, 1, n}]
zeta[n_, s_, 0] := UnitStep[n]
dzeta[n_, s_, k_] := zeta[n, s, k] - zeta[n - 1, s, k]
zetap1[n_, s_, z_] := Sum[ bin[z, k] zeta[n, s, k], {k, 0, n}]
dzetap1[n_, s_, z_] := zetap1[n, s, z] - zetap1[n - 1, s, z]
lzetap1[n_, s_] := Sum[ (-1) ^ (k + 1) / k zeta[n, s, k], {k, 1, n}]
lzetap1k[n_, s_, k_] := D[zetap1[n, s, z], {z, k}] /. z → 0
dlzetap1[n_, s_] := lzetap1[n, s] - lzetap1[n - 1, s]
zetap1l[n_, s_, z_] := Sum[ z^k / k! lzetap1k[n, s, k], {k, 0, n}]

zetam1[n_, s_, k_] := zetam1[n, k] = Sum[j^-s zetam1[n - j, s, k - 1], {j, 2, n}]
zetam1[n_, s_, 0] := UnitStep[n]
dzetam1[n_, s_, k_] := zetam1[n, s, k] - zetam1[n - 1, s, k]
zetatom1[n_, s_, k_] := Sum[ (-1) ^j bin[k, j] zeta[n - j, s, k - j], {j, 0, k}]
zetamtoz[n_, s_, k_] := Sum[ bin[k, j] zetam1[n - j, s, k - j], {j, 0, k}]
zetamm[n_, s_, z_] := Sum[ bin[z, k] zetam1[n, s, k], {k, 0, (n) / 2}]

zetayp0[n_, s_, k_, y_] :=
 zetayp0[n, s, k, y] = zetayp0[n, s, k - 1, y] + Sum[j^-s zetayp0[n - j, s, k - 1, y], {j, y, n}]
zetayp0[n_, s_, 0, y_] := UnitStep[n]
zetayt[n_, s_, z_, y_] :=
 If[ n < y, 1, Sum[ bin[z, k] zetayp0[n - y k, s, z - k, y + 1], {k, 0, n / y}]]
zetaytt[n_, s_, z_, y_] := zetaytt[n, s, z, y] = If[ n < y, 1, zetaytt[n, s, z, y + 1] +
    Sum[ bin[z, k] ( y^-(s k)) zetaytt[n - y k, s, z - k, y + 1], {k, 1, n / y}]]

etam1[n_, s_, k_] := etam1[n, k] = Sum[(-1) ^ (j + 1) j^-s etam1[n - j, s, k - 1], {j, 2, n}]
etam1[n_, s_, 0] := UnitStep[n]
etamm[n_, s_, z_] := Sum[ bin[z, k] etam1[n, s, k], {k, 0, (n) / 2}]
etaroots[n_, s_] := List @@ NRoots[ etamm[n, s, z] == 0, z][[All, 2]]
```

```
Expand@zetap1[15, 0, z]
```

$$1+\frac{1195757\,z}{360360}+\frac{13215487\,z^2}{2802800}+\frac{35118025721\,z^3}{9081072000}+\frac{2065639\,z^4}{997920}+\frac{277382447\,z^5}{359251200}+\frac{2271089\,z^6}{10886400}+\frac{54576553\,z^7}{1306368000}+\frac{4783\,z^8}{762048}+\frac{324509\,z^9}{457228800}+\frac{109\,z^{10}}{1814400}+\frac{26921\,z^{11}}{7185024000}+\frac{z^{12}}{5987520}+\frac{47\,z^{13}}{9340531200}+\frac{z^{14}}{10897286400}+\frac{z^{15}}{1307674368000}$$

```
Table[ dlzetap1[n, 0], {n, 0, 15}]
```

$$\left\{0,1,\frac{1}{2},\frac{1}{3},\frac{1}{4},\frac{1}{5},\frac{1}{6},\frac{1}{7},\frac{1}{8},\frac{1}{9},\frac{1}{10},\frac{1}{11},\frac{1}{12},\frac{1}{13},\frac{1}{14},\frac{1}{15}\right\}$$

```
Table[ lzetap1[n, 0], {n, 0, 15}]
```

$$\left\{0, 1, \frac{3}{2}, \frac{11}{6}, \frac{25}{12}, \frac{137}{60}, \frac{49}{20}, \frac{363}{140}, \frac{761}{280}, \frac{7129}{2520}, \frac{7381}{2520}, \frac{83711}{27720}, \frac{86021}{27720}, \frac{1145993}{360360}, \frac{1171733}{360360}, \frac{1195757}{360360}\right\}$$

```
Table[ HarmonicNumber[ n, 1], {n, 0, 15}]
```

$$\left\{0, 1, \frac{3}{2}, \frac{11}{6}, \frac{25}{12}, \frac{137}{60}, \frac{49}{20}, \frac{363}{140}, \frac{761}{280}, \frac{7129}{2520}, \frac{7381}{2520}, \frac{83711}{27720}, \frac{86021}{27720}, \frac{1145993}{360360}, \frac{1171733}{360360}, \frac{1195757}{360360}\right\}$$

```
Table[ dlzetap1[n, -1], {n, 1, 18}]
```

$$\left\{1, \frac{3}{2}, \frac{4}{3}, \frac{3}{4}, \frac{1}{5}, 0, \frac{1}{7}, \frac{3}{8}, \frac{4}{9}, \frac{3}{10}, \frac{1}{11}, 0, \frac{1}{13}, \frac{3}{14}, \frac{4}{15}, \frac{3}{16}, \frac{1}{17}, 0\right\}$$

```
Grid[Table[ dzeta[3, p, k], {p, -3, 3}, {k, 1, 3}]]
```

27	16	1
9	8	1
3	4	1
1	2	1
$\frac{1}{3}$	1	1
$\frac{1}{9}$	$\frac{1}{2}$	1
$\frac{1}{27}$	$\frac{1}{4}$	1

```
Grid[Table[(3 + 1 - k) ^ -p Binomial[3 - 1, k - 1] , {p, -3, 3}, {k, 1, 3}]]
```

27	16	1
9	8	1
3	4	1
1	2	1
$\frac{1}{3}$	1	1
$\frac{1}{9}$	$\frac{1}{2}$	1
$\frac{1}{27}$	$\frac{1}{4}$	1

```
Grid[Table[ dzeta[5, p, k] / Binomial[5 - 1, k - 1], {p, -5, 5}, {k, 1, 5}]]
```

3125	4400	$\frac{1267}{2}$	32	1
625	776	$\frac{337}{2}$	16	1
125	140	$\frac{91}{2}$	8	1
25	26	$\frac{25}{2}$	4	1
5	5	$\frac{7}{2}$	2	1
1	1	1	1	1
$\frac{1}{5}$	$\frac{5}{24}$	$\frac{7}{24}$	$\frac{1}{2}$	1
$\frac{1}{25}$	$\frac{13}{288}$	$\frac{25}{288}$	$\frac{1}{4}$	1
$\frac{1}{125}$	$\frac{35}{3456}$	$\frac{91}{3456}$	$\frac{1}{8}$	1
$\frac{1}{625}$	$\frac{97}{41472}$	$\frac{337}{41472}$	$\frac{1}{16}$	1
$\frac{1}{3125}$	$\frac{275}{497664}$	$\frac{1267}{497664}$	$\frac{1}{32}$	1

```
FullSimplify@[ bin[z, k] bin[n - 1, k], {k, 0, n}]
```

$$\frac{\text{Gamma}[n+z]}{\text{Gamma}[n]\ \text{Gamma}[1+z]} - (\text{Gamma}[1+n-z]\ \text{HypergeometricPFQRegularized}[\{1, 2, 1+n-z\}, \{2+n, 2+n\}, 1]) / (\text{Gamma}[1-n]\ \text{Gamma}[-z])$$

```
Sum[Binomial[z, k] Binomial[n - 1, k], {k, 0, n}]
```

$$\frac{(-1+n+z)!}{(-1+n)!\ z!}$$

$$\frac{(-1+n+z)!}{(-1+n)!\ z!} \text{ /. } \{z \to 13, n \to 4\}$$

560

```
Pochhammer[6, 15] / 15!
```

15 504

```
dzetap1[15, 0, 6]
```

15 504

```
FullSimplify@Sum[ Binomial[ t - 1, k], {t, 1, n}]
```

$$\frac{k\ \text{Binomial}[0, k] + (-k+n)\ \text{Binomial}[n, k]}{1+k}$$

```
FullSimplify@Sum[Pochhammer[z, t] / t!, {t, 0, n}]
```

$$\frac{\text{Gamma}[1+n+z]}{\text{Gamma}[1+n]\ \text{Gamma}[1+z]}$$

```
FullSimplify@Sum[Binomial[t + z - 1, t], {t, 0, n}]
```

$$\frac{(1+n)\ \text{Binomial}[n+z, 1+n]}{z}$$

```
zetap1[13, 0, 8]
```

203 490

$$\frac{(1+n)\ \text{Binomial}[n+z, 1+n]}{z} \text{ /. } \{n \to 13, z \to 8\}$$

203 490

```
dzeta[16, 0, 4]
```

455

$$\frac{k\ \text{Binomial}[0, k] + (-k+n)\ \text{Binomial}[n, k]}{1+k} \text{ /. } \{n \to 16, k \to 4\}$$

4368

$$\text{Limit}\left[D\left[\frac{(1+n)\ \text{Binomial}[n+z, 1+n]}{z}, z\right], z \to 0\right]$$

```
EulerGamma + PolyGamma[0, 1 + n] /. n → 4
```

$$\frac{25}{12}$$

```
Table[ dzeta[9, 0, k], {k, 1, 10}]
```

{1, 8, 28, 56, 70, 56, 28, 8, 1, 0}

```
Table[ Binomial[9 - 1, k - 1], {k, 1, 10}]
```

{1, 8, 28, 56, 70, 56, 28, 8, 1, 0}

```
Sum[ Binomial[t, 5 - 1], {t, 0, 9}]
```

252

```
dzeta[10, 0, 5]
```

126

```
FullSimplify@Sum[ Binomial[t, k - 1], {t, 0, n - 1}]
```

$$\frac{(1 - k + n)\ \mathrm{Binomial}[n, -1 + k] - \frac{\mathrm{Sin}[k\,\pi]}{\pi}}{k}$$

$$\frac{(1 - k + n)\ \mathrm{Binomial}[n, -1 + k] - \frac{\mathrm{Sin}[k\,\pi]}{\pi}}{k}\ /.\ \{k \to 5\}$$

$$\frac{1}{120}\ (-4 + n)\ (-3 + n)\ (-2 + n)\ (-1 + n)\ n$$

```
bin[n, 5]
```

$$\frac{1}{120}\ (-4 + n)\ (-3 + n)\ (-2 + n)\ (-1 + n)\ n$$

```
bin[9, 4]
```

126

```
Table[ dlzetap1[n, 0], {n, 1, 12}]
```

$$\left\{1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \frac{1}{7}, \frac{1}{8}, \frac{1}{9}, \frac{1}{10}, \frac{1}{11}, \frac{1}{12}\right\}$$

```
Table[ dlzetap1[n, -1], {n, 1, 12}]
```

$$\left\{1, \frac{3}{2}, \frac{4}{3}, \frac{3}{4}, \frac{1}{5}, 0, \frac{1}{7}, \frac{3}{8}, \frac{4}{9}, \frac{3}{10}, \frac{1}{11}, 0\right\}$$

```
Table[ dlzetap1[n, -2], {n, 1, 15}]
```

$$\left\{1, \frac{7}{2}, \frac{16}{3}, \frac{11}{4}, -\frac{29}{5}, -\frac{40}{3}, -\frac{27}{7}, \frac{243}{8}, \frac{520}{9}, \frac{47}{10}, -\frac{1737}{11}, -\frac{784}{3}, \frac{729}{13}, \frac{1753}{2}, \frac{18\,496}{15}\right\}$$

```
Table[ dlzetap1[n, 1], {n, 1, 15}]
```

$$\left\{1, 0, \frac{1}{6}, \frac{1}{24}, \frac{1}{15}, \frac{13}{360}, \frac{97}{2520}, \frac{571}{20\,160}, \frac{1217}{45\,360}, \frac{3391}{151\,200}, \frac{953}{46\,200}, \frac{13\,003}{712\,800}, \frac{434\,737}{25\,945\,920}, \frac{2\,767\,231}{181\,621\,440}, \frac{383\,735\,791}{27\,243\,216\,000}\right\}$$

```
Table[dlzetap1[n, 2], {n, 1, 15}]
```

$$\left\{1, -\frac{1}{4}, \frac{7}{36}, -\frac{23}{288}, \frac{11}{150}, -\frac{523}{16\,200}, \frac{214\,237}{6\,350\,400}, -\frac{1\,439\,687}{101\,606\,400}, \frac{11\,825\,941}{685\,843\,200}, -\frac{144\,510\,727}{22\,861\,440\,000}, \frac{3\,278\,615\,273}{345\,779\,280\,000}, -\frac{53\,684\,706\,431}{19\,916\,886\,528\,000}, \frac{93\,229\,485\,781\,129}{16\,829\,769\,116\,160\,000}, -\frac{32\,337\,215\,505\,289}{33\,319\,542\,896\,640\,000}, \frac{2\,540\,135\,864\,502\,777\,503}{742\,192\,818\,022\,656\,000\,000}\right\}$$

```
Sum[j^-s k^-s l^-s, {j, 2, Infinity}, {k, 2, Infinity}, {l, 2, Infinity}]
```

$(-1 + \text{Zeta}[s])^3$

```
Expand@zetap1[10, 0, z]
```

$$1 + \frac{7381\,z}{2520} + \frac{177\,133\,z^2}{50\,400} + \frac{84\,095\,z^3}{36\,288} + \frac{341\,693\,z^4}{362\,880} + \frac{8591\,z^5}{34\,560} + \frac{7513\,z^6}{172\,800} + \frac{121\,z^7}{24\,192} + \frac{11\,z^8}{30\,240} + \frac{11\,z^9}{725\,760} + \frac{z^{10}}{3\,628\,800}$$

```
Expand@zetap1l[10, 0, z]
```

$$1 + \frac{7381\,z}{2520} + \frac{177\,133\,z^2}{50\,400} + \frac{84\,095\,z^3}{36\,288} + \frac{341\,693\,z^4}{362\,880} + \frac{8591\,z^5}{34\,560} + \frac{7513\,z^6}{172\,800} + \frac{121\,z^7}{24\,192} + \frac{11\,z^8}{30\,240} + \frac{11\,z^9}{725\,760} + \frac{z^{10}}{3\,628\,800}$$

```
Table[{zetam1[13, -1, k], zetatom1[13, -1, k]}, {k, 0, 5}]
```

{{1, 1}, {90, 90}, {1210, 1210}, {5202, 5202}, {8361, 8361}, {4712, 4712}}

```
zetatom1[10, 0, 3]
```

35

```
zeta[10, 0, 2] - 2 zeta[9, 0, 1] + 1
```

28

```
Table[{zetamtoz[14, 1, k], zeta[14, 1, k]}, {k, 0, 5}]
```

$$\left\{\{1, 1\}, \left\{\frac{1\,171\,733}{360\,360}, \frac{1\,171\,733}{360\,360}\right\}, \left\{\frac{30\,946\,717}{3\,439\,800}, \frac{30\,946\,717}{3\,439\,800}\right\}, \left\{\frac{406\,841}{19\,008}, \frac{406\,841}{19\,008}\right\}, \left\{\frac{21\,939\,781}{498\,960}, \frac{21\,939\,781}{498\,960}\right\}, \left\{\frac{22\,463}{288}, \frac{22\,463}{288}\right\}\right\}$$

```
Sum[Binomial[z, k] (Zeta[s] - 1)^k, {k, 0, Infinity}]
```

$\text{Zeta}[s]^z$

```
Expand@etamm[20, N@ZetaZero[1], z]
```

$$1 - (1.12086 - 0.0339383\,i)\,z - (0.357693 - 0.240756\,i)\,z^2 + (0.593717 - 0.831922\,i)\,z^3 - (0.168903 - 0.630057\,i)\,z^4 + (0.0224877 - 0.220685\,i)\,z^5 - (0.00230993 - 0.0389419\,i)\,z^6 - (0.000104797 + 0.00357847\,i)\,z^7 + (0.0000232037 + 0.000155899\,i)\,z^8 - \left(1.41895\times10^{-7} + 2.59262\times10^{-6}\,i\right)z^9 - \left(7.17928\times10^{-9} - 4.7559\times10^{-9}\,i\right)z^{10}$$

```
etaroots[20, N@ZetaZero[1]]
```

{-0.894341 - 0.342431 i, 0.073414 + 1.95327 i, 0.897335 - 0.100598 i, 2.02688 + 0.777048 i, 3.65759 - 1.00578 i, 3.77978 - 4.07971 i, 9.71036 + 10.3563 i, 10.517 + 1.54507 i, 35.2922 - 6.81704 i, 87.4672 - 262.37 i}

```
zetayp0[50, 1, 3, 4]
```

$$\frac{9\,995\,969\,299\,107\,722\,516\,417\,376\,266\,028\,561\,851}{284\,735\,769\,919\,272\,640\,936\,826\,615\,877\,120\,000}$$

```
zetam1[10, 0, 2]
```

28

```
Expand@zetaytt[50, 1, z, 1]
```

$$1+\frac{531\,071\,278\,159\,549\,656\,739\,597\,766\,208\,618\,684\,993\,560\,973\,576\,803\,531\,z}{306\,058\,241\,461\,010\,670\,011\,477\,599\,366\,523\,740\,707\,225\,600\,000\,000\,000}+$$
$$\left(8\,439\,912\,152\,221\,457\,826\,052\,578\,953\,908\,456\,770\,082\,144\,525\,090\,388\,513\,011\,z^2\right)\Big/$$
$$5\,729\,410\,280\,150\,119\,742\,614\,860\,660\,141\,324\,426\,039\,263\,232\,000\,000\,000\,000+$$
$$\left(3\,207\,972\,262\,236\,996\,051\,193\,293\,894\,234\,461\,910\,896\,233\,104\,511\,030\,294\,679\,z^3\right)\Big/$$
$$3\,928\,738\,477\,817\,224\,966\,364\,475\,881\,239\,765\,320\,712\,637\,644\,800\,000\,000\,000+$$
$$\left(1\,206\,605\,019\,393\,266\,194\,512\,335\,582\,433\,359\,510\,458\,179\,267\,895\,510\,802\,633\,z^4\right)\Big/$$
$$3\,626\,527\,825\,677\,438\,430\,490\,285\,428\,836\,706\,449\,888\,588\,595\,200\,000\,000\,000+$$
$$\left(1\,280\,346\,464\,415\,502\,187\,432\,452\,598\,441\,306\,820\,414\,330\,931\,596\,387\,033\,527\,z^5\right)\Big/$$
$$12\,036\,985\,974\,588\,944\,577\,797\,543\,125\,500\,557\,578\,353\,613\,209\,600\,000\,000\,000+$$
$$\left(106\,251\,098\,251\,073\,051\,486\,130\,560\,673\,113\,369\,414\,445\,720\,404\,979\,328\,427\,z^6\right)\Big/$$
$$3\,821\,265\,388\,758\,395\,104\,062\,712\,103\,333\,510\,342\,334\,480\,384\,000\,000\,000\,000+$$
$$\frac{555\,460\,507\,392\,110\,474\,090\,325\,378\,092\,165\,137\,109\,845\,640\,728\,690\,357\,z^7}{90\,828\,855\,719\,140\,436\,986\,614\,590\,598\,459\,112\,161\,489\,715\,200\,000\,000\,000}+$$
$$\left(22\,578\,578\,868\,227\,416\,441\,327\,367\,213\,018\,352\,563\,580\,150\,746\,857\,228\,537\,z^8\right)\Big/$$
$$19\,538\,296\,074\,695\,098\,445\,120\,649\,710\,957\,426\,793\,849\,343\,180\,800\,000\,000\,000+$$
$$\left(27\,842\,967\,858\,374\,630\,752\,755\,743\,729\,557\,489\,441\,620\,048\,159\,495\,571\,z^9\right)\Big/$$
$$146\,050\,385\,940\,411\,865\,453\,559\,673\,919\,116\,977\,694\,887\,116\,800\,000\,000\,000+$$
$$\left(24\,989\,702\,114\,589\,831\,647\,611\,060\,058\,512\,965\,098\,074\,301\,278\,166\,291\,z^{10}\right)\Big/$$
$$898\,771\,605\,787\,149\,941\,252\,674\,916\,425\,335\,247\,353\,151\,488\,000\,000\,000\,000+$$
$$\frac{246\,921\,438\,131\,258\,156\,830\,647\,989\,240\,234\,899\,142\,078\,018\,423\,z^{11}}{68\,176\,163\,351\,808\,549\,634\,057\,497\,453\,199\,662\,828\,748\,800\,000\,000\,000}+$$
$$\frac{677\,417\,398\,284\,610\,174\,021\,263\,850\,928\,001\,212\,710\,036\,954\,901\,z^{12}}{1\,594\,273\,358\,380\,753\,776\,057\,959\,940\,444\,053\,653\,841\,510\,400\,000\,000\,000}+$$
$$\frac{137\,432\,942\,445\,730\,462\,869\,300\,564\,374\,392\,578\,937\,523\,124\,901\,z^{13}}{3\,039\,747\,869\,979\,303\,866\,350\,510\,286\,446\,662\,299\,991\,146\,496\,000\,000\,000}+$$
$$\left(2\,001\,272\,098\,526\,684\,372\,243\,511\,126\,172\,232\,768\,877\,980\,687\,569\,z^{14}\right)\Big/$$
$$455\,962\,180\,496\,895\,579\,952\,576\,542\,966\,999\,344\,998\,671\,974\,400\,000\,000\,000+$$
$$\frac{32\,997\,125\,029\,925\,601\,096\,987\,369\,881\,176\,141\,725\,529\,z^{15}}{84\,452\,454\,602\,465\,545\,717\,864\,017\,115\,450\,032\,783\,360\,000\,000\,000}+$$
$$\frac{2\,597\,110\,783\,568\,126\,940\,101\,673\,201\,933\,423\,214\,680\,779\,z^{16}}{81\,074\,356\,418\,366\,923\,889\,149\,456\,430\,832\,031\,472\,025\,600\,000\,000\,000}+$$
$$\frac{12\,699\,921\,944\,041\,405\,441\,239\,350\,146\,535\,910\,329\,699\,z^{17}}{5\,230\,603\,639\,894\,640\,250\,912\,868\,156\,827\,872\,998\,195\,200\,000\,000\,000}+$$
$$\frac{5\,535\,616\,236\,972\,328\,854\,276\,793\,405\,122\,815\,078\,633\,z^{18}}{32\,429\,742\,567\,346\,769\,555\,659\,782\,572\,332\,812\,588\,810\,240\,000\,000\,000}+$$
$$\frac{1\,256\,982\,024\,530\,935\,057\,804\,259\,816\,859\,907\,447\,z^{19}}{112\,603\,272\,803\,287\,394\,290\,485\,356\,153\,933\,377\,044\,480\,000\,000\,000}+$$

$$\frac{279\,653\,354\,683\,608\,849\,495\,264\,268\,825\,154\,289\,869\ z^{20}}{410\,776\,739\,186\,392\,414\,371\,690\,579\,249\,548\,959\,458\,263\,040\,000\,000\,000} +$$

$$\frac{1\,138\,288\,936\,175\,287\,150\,163\,294\,742\,631\,667\ z^{21}}{29\,333\,373\,423\,258\,017\,936\,052\,094\,149\,861\,153\,177\,600\,000\,000\,000} +$$

$$\frac{10\,829\,856\,107\,626\,684\,025\,418\,807\,944\,851\ z^{22}}{5\,228\,402\,207\,386\,267\,085\,824\,100\,114\,674\,325\,913\,600\,000\,000\,000} +$$

$$\frac{71\,083\,355\,099\,189\,934\,680\,977\,901\,323\,789\ z^{23}}{685\,389\,442\,468\,952\,860\,464\,444\,792\,963\,652\,323\,901\,440\,000\,000\,000} +$$

$$\frac{11\,831\,151\,839\,125\,428\,360\,762\,174\,338\,147\ z^{24}}{2\,425\,224\,181\,043\,987\,044\,720\,343\,113\,563\,692\,838\,420\,480\,000\,000\,000} +$$

$$\frac{39\,792\,879\,087\,048\,235\,988\,180\,483\,677\ z^{25}}{184\,373\,768\,149\,542\,874\,744\,821\,406\,294\,315\,829\,821\,440\,000\,000\,000} +$$

$$\frac{1\,574\,951\,961\,675\,957\,391\,614\,258\,677\,563\ z^{26}}{175\,155\,079\,742\,065\,731\,007\,580\,335\,979\,600\,038\,330\,368\,000\,000\,000\,000} +$$

$$\frac{55\,205\,332\,746\,252\,566\,395\,439\,417\ z^{27}}{156\,388\,464\,055\,415\,831\,256\,768\,157\,124\,642\,891\,366\,400\,000\,000\,000} +$$

$$\frac{1\,115\,204\,119\,570\,471\,183\,366\,951\ z^{28}}{85\,302\,798\,575\,681\,362\,503\,691\,722\,067\,987\,031\,654\,400\,000\,000\,000} +$$

$$\frac{22\,692\,664\,775\,998\,965\,959\,226\,497\ z^{29}}{49\,690\,734\,578\,999\,082\,383\,672\,247\,489\,864\,793\,482\,854\,400\,000\,000\,000} +$$

$$\frac{1\,248\,146\,798\,539\,881\,371\,308\,447\ z^{30}}{82\,817\,890\,964\,998\,470\,639\,453\,745\,816\,441\,322\,471\,424\,000\,000\,000\,000} +$$

$$\frac{3\,648\,473\,280\,449\,048\,234\,041\ z^{31}}{7\,779\,862\,484\,590\,765\,423\,706\,260\,970\,635\,396\,959\,436\,800\,000\,000\,000} +$$

$$\frac{3\,867\,753\,753\,606\,787\,844\,831\ z^{32}}{280\,075\,049\,445\,267\,555\,253\,425\,394\,942\,874\,290\,539\,724\,800\,000\,000\,000} +$$

$$\frac{3\,247\,613\,499\,597\,151\ z^{33}}{8\,491\,239\,675\,153\,636\,770\,962\,448\,306\,538\,754\,867\,200\,000\,000\,000} +$$

$$\frac{16\,640\,548\,791\,492\,167\ z^{34}}{1\,654\,578\,702\,415\,651\,507\,941\,825\,641\,445\,551\,662\,694\,400\,000\,000\,000} +$$

$$\frac{2\,636\,556\,281\,531\ z^{35}}{10\,674\,701\,305\,907\,429\,083\,495\,649\,299\,648\,720\,404\,480\,000\,000\,000} +$$

$$\frac{1\,882\,644\,951\,661\,687\ z^{36}}{324\,297\,425\,673\,467\,695\,556\,597\,825\,723\,328\,125\,888\,102\,400\,000\,000\,000} +$$

$$\frac{1\,504\,153\,693\,362\,223\ z^{37}}{11\,999\,004\,749\,918\,304\,735\,594\,119\,551\,763\,140\,657\,859\,788\,800\,000\,000\,000} +$$

$$\left(1\,204\,136\,467\,557\,823\ z^{38}\right) / 455\,962\,180\,496\,895\,579\,952\,576\,542\,966\,999\,344\,998\,671\,974\,400\,000\,000\,000 +$$

$$\frac{20\,075\,770\,943\ z^{39}}{407\,109\,089\,729\,371\,053\,529\,086\,199\,077\,677\,986\,605\,957\,120\,000\,000\,000} +$$

$$\frac{509\,187\,949\ z^{40}}{542\,812\,119\,639\,161\,404\,705\,448\,265\,436\,903\,982\,141\,276\,160\,000\,000\,000} +$$

$$\frac{297\,131\,929\ z^{41}}{20\,232\,088\,095\,641\,470\,539\,021\,253\,529\,920\,966\,607\,083\,929\,600\,000\,000\,000} +$$

$$\frac{536\,623\,z^{42}}{2\,092\,974\,630\,583\,600\,400\,588\,405\,537\,578\,031\,028\,319\,027\,200\,000\,000\,000} +$$
$$\frac{30\,619\,z^{43}}{9\,615\,566\,079\,139\,077\,840\,387\,469\,440\,799\,280\,445\,366\,730\,752\,000\,000\,000} +$$
$$\left(845\,381\,z^{44}\right) / 16\,077\,226\,484\,320\,538\,149\,127\,848\,905\,016\,396\,904\,653\,173\,817\,344\,000\,000\,000 +$$
$$\frac{z^{45}}{2\,126\,617\,259\,830\,759\,014\,434\,900\,648\,811\,692\,712\,255\,710\,822\,400\,000\,000} +$$
$$\left(53\,z^{46}\right) / 6\,878\,277\,699\,765\,111\,187\,312\,881\,786\,000\,318\,616\,202\,064\,691\,200\,000\,000\,000 +$$
$$z^{47} / 23\,965\,088\,016\,478\,904\,770\,004\,419\,010\,373\,310\,885\,176\,614\,584\,320\,000\,000\,000 +$$
$$z^{48} / 1\,379\,323\,954\,726\,230\,296\,762\,476\,560\,819\,263\,893\,169\,054\,039\,408\,640\,000\,000\,000 +$$
$$z^{49} / 608\,281\,864\,034\,267\,560\,872\,252\,163\,321\,295\,376\,887\,552\,831\,379\,210\,240\,000\,000\,000 +$$
$$z^{50} / 30\,414\,093\,201\,713\,378\,043\,612\,608\,166\,064\,768\,844\,377\,641\,568\,960\,512\,000\,000\,000\,000$$