General formula for a large class of Euler sums

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Abstract

Let $H(k) = 1+1/2+1/3+\cdots+1/k$ denote the harmonic function. We present a general formula, giving a closed-form evaluation in terms of the polygamma function, for Euler sums of the form

$$\sum_{k=1}^{\infty} \frac{H(k)}{(mk+n)^p}$$

(for integers $m \geq 1$, nonzero n not a multiple of $-m$ and $p \geq 2$). We have not yet proved this formula but have confirmed it numerically in hundreds of cases. We further conjecture that sums such as

$$\sum_{k=1}^{\infty} \frac{H(k)}{(m_1 k+n_1)^{p_1}(m_2 k+n_2)^{p_2}\cdots(m_r k+n_r)^{p_r}}$$

are given by a rational linear sum of terms selected from the union of the set of terms given for each denominator factor by the first conjecture. We further present a catalog of 16 sample formulas given by the first conjecture and 252 sample formulas given by the second conjecture, all of which have been checked numerically using high-precision arithmetic.

1 Introduction

In an earlier study [1], we presented results for mixed Euler sums, namely sums of the form

$$M(m, n_0, n_1, n_2, \ldots, n_t) = \sum_{k=1}^{\infty} \frac{H(k)^m}{k^{n_0}(k+1)^{n_1}(k+2)^{n_2}\cdots(k+t)^{n_t}}, \tag{1}$$

for nonnegative integers m and (n_i), with $m \geq 1$ and $n_0+n_1+\cdots+n_t \geq 2$. We showed that these have closed-form evaluations in terms of the Riemann zeta function, at least when $m+n_0+\cdots+n_t \leq 12$. We then presented a catalog of over 1000 formulas, which we produced using high-precision numerical evaluation of the sums, followed by the application of an integer relation algorithm to find the coefficients.

These results, however, leave open the case where the denominator polynomial(s) have more complicated terms, such as $(2k+1)^2$ or $(5k+4)^3$. To that end, we have found this conjectured result by experimental methods, using a combination of *Mathematica*, the Online Encyclopedia of Integer Sequences, and high-precision numerical computing:

Conjecture 1: Let $H(k) = 1 + 1/2 + 1/3 + \cdots + 1/k$ be the harmonic function, let $\psi(q, z)$ denote the polygamma function, and let $Q(k, p) = 1/2$ if p is odd and $k = (p-1)/2$, and 1 otherwise. Then for integers $m \geq 1$, nonzero n not a multiple of $-m$ and $p \geq 2$,

$$\sum_{k=1}^{\infty} \frac{H(k)}{(mk+n)^p} = \frac{p}{2m^p n^p p!} \left(\frac{m^{p+1} p!}{n} + (-1)^p 2n^p (\gamma + \psi(0, n/m)) \psi(p-1, n/m) \right.$$
$$\left. + (-1)^p 2n^p \sum_{k=1}^{\lfloor (p-1)/2 \rfloor} Q(k,p) \binom{p-1}{k} \psi(k, n/m) \psi(p-1-k, n/m) - (-1)^p n^p \psi(p, 1+n/m) \right). \quad (2)$$

We do not yet have a proof, but the identity has been numerically checked, using 100-digit arithmetic, for all the cases $\{2 \leq m \leq 10,\ |n| \leq m,\ n \neq 0, n \neq -m,\ 2 \leq p \leq 10\}$, a set of 900 individual cases.

Conjecture 2: Any Euler sum of the form

$$G(m_1, n_1, p_1, \cdots, m_r, n_r, p_r) = \sum_{k=1}^{\infty} \frac{H(k)}{(m_1 k + n_1)^{p_1} (m_2 k + n_2)^{p_2} \cdots (m_r k + n_r)^{p_r}} \quad (3)$$

for integers m_j, n_j, p_j as above is given by a rational linear sum of terms taken from the the set $\bigcup_{1 \leq i \leq r,\, 1 \leq j \leq p_i} T_{i,j}$, where $T_{i,j}$ is the set of terms given by (2) in Conjecture 1 for $\sum_{k \geq 1} H(k)/(m_i k + n_i)^j$. Note that this includes the terms formally produced by (2) for $j = 1$, which sums do not converge.

Again, we do not yet have proof for this assertion, but we have confirmed it numerically, using 300-digit precision, in hundreds of cases.

References

[1] D.H. Bailey and R.C. McPhedran, "New results for Euler sums," arXiv:2311.06294, Jul 2025, at https://arxiv.org/abs/2311.06294.

2 Catalog of formulas found by computer using Conjecture 1

We present here a selection of formulas that we have produced according to Conjecture 1. These were actually generated by a program that computes each sum to 300-digit precision, then uses the multipair PSLQ integer relation algorithm, using the appropriate set of terms as given in Conjecture 1, to find the rational coefficients. To guard against the possibility of transcription errors, the LaTeX code for these formulas was produced by a program directly from the computer output, and is included here without alteration.

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^2} = \frac{1}{8} \left(16 + 2\gamma\psi(1, 1/2) + 2\psi(0, 1/2)\psi(1, 1/2) - 1\psi(2, 3/2)\right) \quad (4)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3} = \frac{1}{16} \left(1\psi(1, 1/2)^2 - 1\gamma\psi(2, 1/2) - 1\psi(0, 1/2)\psi(2, 1/2)\right) \quad (5)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)^2} = \frac{1}{18} \left(54 + 2\gamma\psi(1, 1/3) + 2\psi(0, 1/3)\psi(1, 1/3) - 1\psi(2, 4/3)\right) \quad (6)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)^3} = \frac{1}{108} \left(486 - 2\psi(1, 1/3)^2 - 2\gamma\psi(2, 1/3) - 2\psi(0, 1/3)\psi(2, 1/3) + 1\psi(3, 4/3)\right) \quad (7)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+2)^2} = \frac{1}{72} \left(27 + 8\gamma\psi(1, 2/3) + 8\psi(0, 2/3)\psi(1, 2/3) - 4\psi(2, 5/3)\right) \quad (8)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+2)^3} = \frac{1}{864} \left(243 - 16\psi(1,2/3)^2 - 16\gamma\psi(2,2/3) - 16\psi(0,2/3)\psi(2,2/3) + 8\psi(3,5/3)\right) \quad (9)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(4k+1)^2} = \frac{1}{32} \left(128 + 2\gamma\psi(1,1/4) + 2\psi(0,1/4)\psi(1,1/4) - 1\psi(2,5/4)\right) \quad (10)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(4k+1)^3} = \frac{1}{256} \left(1536 - 2\psi(1,1/4)^2 - 2\gamma\psi(2,1/4) - 2\psi(0,1/4)\psi(2,1/4) + 1\psi(3,5/4)\right) \quad (11)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(4k+3)^2} = \frac{1}{864} \left(128 + 54\gamma\psi(1,3/4) + 54\psi(0,3/4)\psi(1,3/4) - 27\psi(2,7/4)\right) \quad (12)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(4k+3)^3} = \frac{1}{6912} \left(512 - 54\psi(1,3/4)^2 - 54\gamma\psi(2,3/4) - 54\psi(0,3/4)\psi(2,3/4) + 27\psi(3,7/4)\right) \quad (13)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(5k+1)^2} = \frac{1}{50} \left(250 + 2\gamma\psi(1,1/5) + 2\psi(0,1/5)\psi(1,1/5) - 1\psi(2,6/5)\right) \quad (14)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(5k+1)^3} = \frac{1}{500} \left(3750 - 2\psi(1,1/5)^2 - 2\gamma\psi(2,1/5) - 2\psi(0,1/5)\psi(2,1/5) + 1\psi(3,6/5)\right) \quad (15)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(5k+2)^2} = \frac{1}{200} \left(125 + 8\gamma\psi(1,2/5) + 8\psi(0,2/5)\psi(1,2/5) - 4\psi(2,7/5)\right) \quad (16)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(5k+2)^3} = \frac{1}{4000} \left(1875 - 16\psi(1,2/5)^2 - 16\gamma\psi(2,2/5) - 16\psi(0,2/5)\psi(2,2/5) + 8\psi(3,7/5)\right) \quad (17)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(5k+3)^2} = \frac{1}{1350} \left(250 + 54\gamma\psi(1,3/5) + 54\psi(0,3/5)\psi(1,3/5) - 27\psi(2,8/5)\right) \quad (18)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(5k+3)^3} = \frac{1}{13500} \left(1250 - 54\psi(1,3/5)^2 - 54\gamma\psi(2,3/5) - 54\psi(0,3/5)\psi(2,3/5) + 27\psi(3,8/5)\right) \quad (19)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(5k+4)^2} = \frac{1}{1600} \left(125 + 64\gamma\psi(1,4/5) + 64\psi(0,4/5)\psi(1,4/5) - 32\psi(2,9/5)\right) \quad (20)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(5k+4)^3} = \frac{1}{64000} \left(1875 - 256\psi(1,4/5)^2 - 256\gamma\psi(2,4/5) - 256\psi(0,4/5)\psi(2,4/5) + 128\psi(3,9/5)\right) \quad (21)$$

3 Catalog of formulas found by computer using Conjecture 2

Here is a selection of formulas produced according to Conjecture 2. As before, these were actually generated by a program that computes each sum to 300-digit precision, then uses the multipair PSLQ integer relation algorithm, using the appropriate set of terms given in Conjecture 2, to find the rational coefficients. Also as before, to guard against the possibility of transcription errors, the LaTeX code for these formulas (even including line breaks and page breaks) was produced by a program directly from the computer output, and is included here without any alteration.

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(3k+1)} = \frac{1}{2}\left(5+2\gamma\psi(0,1/2)+1\psi(0,1/2)^2-2\gamma\psi(0,1/3)-1\psi(0,1/3)^2-1\psi(1,3/2)\right.$$
$$\left.+1\psi(1,4/3)\right) \tag{22}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(3k+1)^2} = \frac{1}{6}\left(24-12\gamma\psi(0,1/2)-6\psi(0,1/2)^2+12\gamma\psi(0,1/3)+6\psi(0,1/3)^2+2\gamma\psi(1,1/3)\right.$$
$$\left.+2\psi(0,1/3)\psi(1,1/3)+6\psi(1,3/2)-6\psi(1,4/3)-1\psi(2,4/3)\right) \tag{23}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(3k+1)^3} = \frac{1}{36}\left(198+144\gamma\psi(0,1/2)+72\psi(0,1/2)^2-144\gamma\psi(0,1/3)-72\psi(0,1/3)^2\right.$$
$$-24\gamma\psi(1,1/3)-24\psi(0,1/3)\psi(1,1/3)-2\psi(1,1/3)^2-2\gamma\psi(2,1/3)$$
$$\left.-2\psi(0,1/3)\psi(2,1/3)-72\psi(1,3/2)+72\psi(1,4/3)+12\psi(2,4/3)+1\psi(3,4/3)\right) \tag{24}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(3k+2)} = \frac{1}{8}\left(7-8\gamma\psi(0,1/2)-4\psi(0,1/2)^2+8\gamma\psi(0,2/3)+4\psi(0,2/3)^2+4\psi(1,3/2)\right.$$
$$\left.-4\psi(1,5/3)\right) \tag{25}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(3k+2)^2} = \frac{1}{24}\left(15-48\gamma\psi(0,1/2)-24\psi(0,1/2)^2+48\gamma\psi(0,2/3)+24\psi(0,2/3)^2\right.$$
$$\left.-8\gamma\psi(1,2/3)-8\psi(0,2/3)\psi(1,2/3)+24\psi(1,3/2)-24\psi(1,5/3)+4\psi(2,5/3)\right) \tag{26}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(3k+2)^3} = \frac{1}{288}\left(117-1152\gamma\psi(0,1/2)-576\psi(0,1/2)^2+1152\gamma\psi(0,2/3)+576\psi(0,2/3)^2\right.$$
$$-192\gamma\psi(1,2/3)-192\psi(0,2/3)\psi(1,2/3)+16\psi(1,2/3)^2+16\gamma\psi(2,2/3)$$
$$\left.+16\psi(0,2/3)\psi(2,2/3)+576\psi(1,3/2)-576\psi(1,5/3)+96\psi(2,5/3)-8\psi(3,5/3)\right) \tag{27}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(4k+1)} = \frac{1}{4}\left(12+2\gamma\psi(0,1/2)+1\psi(0,1/2)^2-2\gamma\psi(0,1/4)-1\psi(0,1/4)^2-1\psi(1,3/2)\right.$$
$$\left.+1\psi(1,5/4)\right) \tag{28}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(4k+1)^2} = \frac{1}{16}\left(80-8\gamma\psi(0,1/2)-4\psi(0,1/2)^2+8\gamma\psi(0,1/4)+4\psi(0,1/4)^2+2\gamma\psi(1,1/4)\right.$$
$$\left.+2\psi(0,1/4)\psi(1,1/4)+4\psi(1,3/2)-4\psi(1,5/4)-1\psi(2,5/4)\right) \tag{29}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(4k+1)^3} = \frac{1}{128}\left(896+64\gamma\psi(0,1/2)+32\psi(0,1/2)^2-64\gamma\psi(0,1/4)-32\psi(0,1/4)^2\right.$$
$$-16\gamma\psi(1,1/4)-16\psi(0,1/4)\psi(1,1/4)-2\psi(1,1/4)^2-2\gamma\psi(2,1/4)$$
$$\left.-2\psi(0,1/4)\psi(2,1/4)-32\psi(1,3/2)+32\psi(1,5/4)+8\psi(2,5/4)+1\psi(3,5/4)\right) \tag{30}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(4k+3)} = \frac{1}{36}\left(20-18\gamma\psi(0,1/2)-9\psi(0,1/2)^2+18\gamma\psi(0,3/4)+9\psi(0,3/4)^2+9\psi(1,3/2)\right.$$
$$\left.-9\psi(1,7/4)\right) \tag{31}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(4k+3)^2}=\frac{1}{432}\big(112-216\gamma\psi(0,1/2)-108\psi(0,1/2)^2+216\gamma\psi(0,3/4)+108\psi(0,3/4)^2$$
$$-54\gamma\psi(1,3/4)-54\psi(0,3/4)\psi(1,3/4)+108\psi(1,3/2)-108\psi(1,7/4)$$
$$+27\psi(2,7/4)\big) \tag{32}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(4k+3)^3}=\frac{1}{1152}\big(128-576\gamma\psi(0,1/2)-288\psi(0,1/2)^2+576\gamma\psi(0,3/4)+288\psi(0,3/4)^2$$
$$-144\gamma\psi(1,3/4)-144\psi(0,3/4)\psi(1,3/4)+18\psi(1,3/4)^2+18\gamma\psi(2,3/4)$$
$$+18\psi(0,3/4)\psi(2,3/4)+288\psi(1,3/2)-288\psi(1,7/4)+72\psi(2,7/4)-9\psi(3,7/4)\big) \tag{33}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+1)}=\frac{1}{6}\big(21+2\gamma\psi(0,1/2)+1\psi(0,1/2)^2-2\gamma\psi(0,1/5)-1\psi(0,1/5)^2-1\psi(1,3/2)$$
$$+1\psi(1,6/5)\big) \tag{34}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+1)^2}=\frac{1}{90}\big(540-20\gamma\psi(0,1/2)-10\psi(0,1/2)^2+20\gamma\psi(0,1/5)+10\psi(0,1/5)^2$$
$$+6\gamma\psi(1,1/5)+6\psi(0,1/5)\psi(1,1/5)+10\psi(1,3/2)-10\psi(1,6/5)-3\psi(2,6/5)\big) \tag{35}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+1)^3}=\frac{1}{2700}\big(22950+400\gamma\psi(0,1/2)+200\psi(0,1/2)^2-400\gamma\psi(0,1/5)-200\psi(0,1/5)^2$$
$$-120\gamma\psi(1,1/5)-120\psi(0,1/5)\psi(1,1/5)-18\psi(1,1/5)^2-18\gamma\psi(2,1/5)$$
$$-18\psi(0,1/5)\psi(2,1/5)-200\psi(1,3/2)+200\psi(1,6/5)+60\psi(2,6/5)+9\psi(3,6/5)\big) \tag{36}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+2)}=\frac{1}{8}\big(9+8\gamma\psi(0,1/2)+4\psi(0,1/2)^2-8\gamma\psi(0,2/5)-4\psi(0,2/5)^2-4\psi(1,3/2)$$
$$+4\psi(1,7/5)\big) \tag{37}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+2)^2}=\frac{1}{40}\big(35-80\gamma\psi(0,1/2)-40\psi(0,1/2)^2+80\gamma\psi(0,2/5)+40\psi(0,2/5)^2$$
$$+8\gamma\psi(1,2/5)+8\psi(0,2/5)\psi(1,2/5)+40\psi(1,3/2)-40\psi(1,7/5)-4\psi(2,7/5)\big) \tag{38}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+2)^3}=\frac{1}{800}\big(475+3200\gamma\psi(0,1/2)+1600\psi(0,1/2)^2-3200\gamma\psi(0,2/5)-1600\psi(0,2/5)^2$$
$$-320\gamma\psi(1,2/5)-320\psi(0,2/5)\psi(1,2/5)-16\psi(1,2/5)^2-16\gamma\psi(2,2/5)$$
$$-16\psi(0,2/5)\psi(2,2/5)-1600\psi(1,3/2)+1600\psi(1,7/5)+160\psi(2,7/5)+8\psi(3,7/5)\big) \tag{39}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+3)}=\frac{1}{18}\big(11-18\gamma\psi(0,1/2)-9\psi(0,1/2)^2+18\gamma\psi(0,3/5)+9\psi(0,3/5)^2+9\psi(1,3/2)$$
$$-9\psi(1,8/5)\big) \tag{40}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+3)^2}=\frac{1}{270}\big(80-540\gamma\psi(0,1/2)-270\psi(0,1/2)^2+540\gamma\psi(0,3/5)+270\psi(0,3/5)^2$$
$$-54\gamma\psi(1,3/5)-54\psi(0,3/5)\psi(1,3/5)+270\psi(1,3/2)-270\psi(1,8/5)$$
$$+27\psi(2,8/5)\big) \tag{41}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+3)^3}=\frac{1}{2700}\big(350-10800\gamma\psi(0,1/2)-5400\psi(0,1/2)^2+10800\gamma\psi(0,3/5)+5400\psi(0,3/5)^2$$
$$-1080\gamma\psi(1,3/5)-1080\psi(0,3/5)\psi(1,3/5)+54\psi(1,3/5)^2+54\gamma\psi(2,3/5)$$
$$+54\psi(0,3/5)\psi(2,3/5)+5400\psi(1,3/2)-5400\psi(1,8/5)+540\psi(2,8/5)-27\psi(3,8/5)\big) \tag{42}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+4)}=\frac{1}{96}\big(39-32\gamma\psi(0,1/2)-16\psi(0,1/2)^2+32\gamma\psi(0,4/5)+16\psi(0,4/5)^2+16\psi(1,3/2)$$
$$-16\psi(1,9/5)\big) \tag{43}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+4)^2}=\frac{1}{2880}\big(405-640\gamma\psi(0,1/2)-320\psi(0,1/2)^2+640\gamma\psi(0,4/5)+320\psi(0,4/5)^2$$
$$-192\gamma\psi(1,4/5)-192\psi(0,4/5)\psi(1,4/5)+320\psi(1,3/2)-320\psi(1,9/5)$$
$$+96\psi(2,9/5)\big) \tag{44}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)(5k+4)^3}=\frac{1}{345600}\big(15525-51200\gamma\psi(0,1/2)-25600\psi(0,1/2)^2+51200\gamma\psi(0,4/5)$$
$$+25600\psi(0,4/5)^2-15360\gamma\psi(1,4/5)-15360\psi(0,4/5)\psi(1,4/5)+2304\psi(1,4/5)^2$$
$$+2304\gamma\psi(2,4/5)+2304\psi(0,4/5)\psi(2,4/5)+25600\psi(1,3/2)-25600\psi(1,9/5)$$
$$+7680\psi(2,9/5)-1152\psi(3,9/5)\big) \tag{45}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(3k+1)}=\frac{1}{4}\big(14+12\gamma\psi(0,1/2)+6\psi(0,1/2)^2-12\gamma\psi(0,1/3)-6\psi(0,1/3)^2-2\gamma\psi(1,1/2)$$
$$-2\psi(0,1/2)\psi(1,1/2)-6\psi(1,3/2)+6\psi(1,4/3)+1\psi(2,3/2)\big) \tag{46}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(3k+1)^2}=\frac{1}{2}\big(10-24\gamma\psi(0,1/2)-12\psi(0,1/2)^2+24\gamma\psi(0,1/3)+12\psi(0,1/3)^2$$
$$+2\gamma\psi(1,1/2)+2\psi(0,1/2)\psi(1,1/2)+2\gamma\psi(1,1/3)+2\psi(0,1/3)\psi(1,1/3)$$
$$+12\psi(1,3/2)-12\psi(1,4/3)-1\psi(2,3/2)-1\psi(2,4/3)\big) \tag{47}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(3k+1)^3}=\frac{1}{12}\big(78+432\gamma\psi(0,1/2)+216\psi(0,1/2)^2-432\gamma\psi(0,1/3)-216\psi(0,1/3)^2$$
$$-24\gamma\psi(1,1/2)-24\psi(0,1/2)\psi(1,1/2)-48\gamma\psi(1,1/3)-48\psi(0,1/3)\psi(1,1/3)$$
$$-2\psi(1,1/3)^2-2\gamma\psi(2,1/3)-2\psi(0,1/3)\psi(2,1/3)-216\psi(1,3/2)+216\psi(1,4/3)$$
$$+12\psi(2,3/2)+24\psi(2,4/3)+1\psi(3,4/3)\big) \tag{48}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(3k+2)}=\frac{1}{8}\big(11+24\gamma\psi(0,1/2)+12\psi(0,1/2)^2-24\gamma\psi(0,2/3)-12\psi(0,2/3)^2+4\gamma\psi(1,1/2)$$
$$+4\psi(0,1/2)\psi(1,1/2)-12\psi(1,3/2)+12\psi(1,5/3)-2\psi(2,3/2)\big) \tag{49}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(3k+2)^2}=\frac{1}{8}\big(7+96\gamma\psi(0,1/2)+48\psi(0,1/2)^2-96\gamma\psi(0,2/3)-48\psi(0,2/3)^2$$
$$+8\gamma\psi(1,1/2)+8\psi(0,1/2)\psi(1,1/2)+8\gamma\psi(1,2/3)+8\psi(0,2/3)\psi(1,2/3)$$
$$-48\psi(1,3/2)+48\psi(1,5/3)-4\psi(2,3/2)-4\psi(2,5/3)\big) \tag{50}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(3k+2)^3}=\frac{1}{96}\big(51+3456\gamma\psi(0,1/2)+1728\psi(0,1/2)^2-3456\gamma\psi(0,2/3)-1728\psi(0,2/3)^2$$
$$+192\gamma\psi(1,1/2)+192\psi(0,1/2)\psi(1,1/2)+384\gamma\psi(1,2/3)+384\psi(0,2/3)\psi(1,2/3)$$
$$-16\psi(1,2/3)^2-16\gamma\psi(2,2/3)-16\psi(0,2/3)\psi(2,2/3)-1728\psi(1,3/2)+1728\psi(1,5/3)$$
$$-96\psi(2,3/2)-192\psi(2,5/3)+8\psi(3,5/3)\big) \tag{51}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(4k+1)}=\frac{1}{8}\big(32+8\gamma\psi(0,1/2)+4\psi(0,1/2)^2-8\gamma\psi(0,1/4)-4\psi(0,1/4)^2-2\gamma\psi(1,1/2)$$
$$-2\psi(0,1/2)\psi(1,1/2)-4\psi(1,3/2)+4\psi(1,5/4)+1\psi(2,3/2)\big) \tag{52}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(4k+1)^2}=\frac{1}{8}\big(48-16\gamma\psi(0,1/2)-8\psi(0,1/2)^2+16\gamma\psi(0,1/4)+8\psi(0,1/4)^2$$
$$+2\gamma\psi(1,1/2)+2\psi(0,1/2)\psi(1,1/2)+2\gamma\psi(1,1/4)+2\psi(0,1/4)\psi(1,1/4)$$
$$+8\psi(1,3/2)-8\psi(1,5/4)-1\psi(2,3/2)-1\psi(2,5/4)\big) \tag{53}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(4k+1)^3}=\frac{1}{64}\big(512+192\gamma\psi(0,1/2)+96\psi(0,1/2)^2-192\gamma\psi(0,1/4)-96\psi(0,1/4)^2$$
$$-16\gamma\psi(1,1/2)-16\psi(0,1/2)\psi(1,1/2)-32\gamma\psi(1,1/4)-32\psi(0,1/4)\psi(1,1/4)$$
$$-2\psi(1,1/4)^2-2\gamma\psi(2,1/4)-2\psi(0,1/4)\psi(2,1/4)-96\psi(1,3/2)+96\psi(1,5/4)$$
$$+8\psi(2,3/2)+16\psi(2,5/4)+1\psi(3,5/4)\big) \tag{54}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(4k+3)}=\frac{1}{72}\big(64+72\gamma\psi(0,1/2)+36\psi(0,1/2)^2-72\gamma\psi(0,3/4)-36\psi(0,3/4)^2$$
$$+18\gamma\psi(1,1/2)+18\psi(0,1/2)\psi(1,1/2)-36\psi(1,3/2)+36\psi(1,7/4)-9\psi(2,3/2)\big) \tag{55}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(4k+3)^2}=\frac{1}{216}\big(80+432\gamma\psi(0,1/2)+216\psi(0,1/2)^2-432\gamma\psi(0,3/4)-216\psi(0,3/4)^2$$
$$+54\gamma\psi(1,1/2)+54\psi(0,1/2)\psi(1,1/2)+54\gamma\psi(1,3/4)+54\psi(0,3/4)\psi(1,3/4)$$
$$-216\psi(1,3/2)+216\psi(1,7/4)-27\psi(2,3/2)-27\psi(2,7/4)\big) \tag{56}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(4k+3)^3}=\frac{1}{1728}\big(256+5184\gamma\psi(0,1/2)+2592\psi(0,1/2)^2-5184\gamma\psi(0,3/4)-2592\psi(0,3/4)^2$$
$$+432\gamma\psi(1,1/2)+432\psi(0,1/2)\psi(1,1/2)+864\gamma\psi(1,3/4)+864\psi(0,3/4)\psi(1,3/4)$$
$$-54\psi(1,3/4)^2-54\gamma\psi(2,3/4)-54\psi(0,3/4)\psi(2,3/4)-2592\psi(1,3/2)+2592\psi(1,7/4)$$
$$-216\psi(2,3/2)-432\psi(2,7/4)+27\psi(3,7/4)\big) \tag{57}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+1)}=\frac{1}{36}\big(162+20\gamma\psi(0,1/2)+10\psi(0,1/2)^2-20\gamma\psi(0,1/5)-10\psi(0,1/5)^2$$
$$-6\gamma\psi(1,1/2)-6\psi(0,1/2)\psi(1,1/2)-10\psi(1,3/2)+10\psi(1,6/5)+3\psi(2,3/2)\big) \tag{58}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+1)^2}=\frac{1}{54}\big(378-40\gamma\psi(0,1/2)-20\psi(0,1/2)^2+40\gamma\psi(0,1/5)+20\psi(0,1/5)^2$$
$$+6\gamma\psi(1,1/2)+6\psi(0,1/2)\psi(1,1/2)+6\gamma\psi(1,1/5)+6\psi(0,1/5)\psi(1,1/5)$$
$$+20\psi(1,3/2)-20\psi(1,6/5)-3\psi(2,3/2)-3\psi(2,6/5)\big) \tag{59}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+1)^3}=\frac{1}{540}\big(5130+400\gamma\psi(0,1/2)+200\psi(0,1/2)^2-400\gamma\psi(0,1/5)-200\psi(0,1/5)^2$$
$$-40\gamma\psi(1,1/2)-40\psi(0,1/2)\psi(1,1/2)-80\gamma\psi(1,1/5)-80\psi(0,1/5)\psi(1,1/5)$$
$$-6\psi(1,1/5)^2-6\gamma\psi(2,1/5)-6\psi(0,1/5)\psi(2,1/5)-200\psi(1,3/2)+200\psi(1,6/5)$$
$$+20\psi(2,3/2)+40\psi(2,6/5)+3\psi(3,6/5)\big) \tag{60}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+2)}=\frac{1}{8}\big(13+40\gamma\psi(0,1/2)+20\psi(0,1/2)^2-40\gamma\psi(0,2/5)-20\psi(0,2/5)^2-4\gamma\psi(1,1/2)$$
$$-4\psi(0,1/2)\psi(1,1/2)-20\psi(1,3/2)+20\psi(1,7/5)+2\psi(2,3/2)\big) \tag{61}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+2)^2}=\frac{1}{8}\big(9-160\gamma\psi(0,1/2)-80\psi(0,1/2)^2+160\gamma\psi(0,2/5)+80\psi(0,2/5)^2$$
$$+8\gamma\psi(1,1/2)+8\psi(0,1/2)\psi(1,1/2)+8\gamma\psi(1,2/5)+8\psi(0,2/5)\psi(1,2/5)$$
$$+80\psi(1,3/2)-80\psi(1,7/5)-4\psi(2,3/2)-4\psi(2,7/5)\big) \tag{62}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+2)^3}=\frac{1}{160}\big(115+9600\gamma\psi(0,1/2)+4800\psi(0,1/2)^2-9600\gamma\psi(0,2/5)-4800\psi(0,2/5)^2$$
$$-320\gamma\psi(1,1/2)-320\psi(0,1/2)\psi(1,1/2)-640\gamma\psi(1,2/5)-640\psi(0,2/5)\psi(1,2/5)$$
$$-16\psi(1,2/5)^2-16\gamma\psi(2,2/5)-16\psi(0,2/5)\psi(2,2/5)-4800\psi(1,3/2)+4800\psi(1,7/5)$$
$$+160\psi(2,3/2)+320\psi(2,7/5)+8\psi(3,7/5)\big) \tag{63}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+3)}=\frac{1}{36}\big(34+180\gamma\psi(0,1/2)+90\psi(0,1/2)^2-180\gamma\psi(0,3/5)-90\psi(0,3/5)^2$$
$$+18\gamma\psi(1,1/2)+18\psi(0,1/2)\psi(1,1/2)-90\psi(1,3/2)+90\psi(1,8/5)-9\psi(2,3/2)\big) \tag{64}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+3)^2}=\frac{1}{54}\big(22+1080\gamma\psi(0,1/2)+540\psi(0,1/2)^2-1080\gamma\psi(0,3/5)-540\psi(0,3/5)^2$$
$$+54\gamma\psi(1,1/2)+54\psi(0,1/2)\psi(1,1/2)+54\gamma\psi(1,3/5)+54\psi(0,3/5)\psi(1,3/5)$$
$$-540\psi(1,3/2)+540\psi(1,8/5)-27\psi(2,3/2)-27\psi(2,8/5)\big) \tag{65}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+3)^3}=\frac{1}{60}\big(10+3600\gamma\psi(0,1/2)+1800\psi(0,1/2)^2-3600\gamma\psi(0,3/5)-1800\psi(0,3/5)^2$$
$$+120\gamma\psi(1,1/2)+120\psi(0,1/2)\psi(1,1/2)+240\gamma\psi(1,3/5)+240\psi(0,3/5)\psi(1,3/5)$$
$$-6\psi(1,3/5)^2-6\gamma\psi(2,3/5)-6\psi(0,3/5)\psi(2,3/5)-1800\psi(1,3/2)+1800\psi(1,8/5)$$
$$-60\psi(2,3/2)-120\psi(2,8/5)+3\psi(3,8/5)\big) \tag{66}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+4)} = \frac{1}{288}\big(189+160\gamma\psi(0,1/2)+80\psi(0,1/2)^2-160\gamma\psi(0,4/5)-80\psi(0,4/5)^2$$
$$+48\gamma\psi(1,1/2)+48\psi(0,1/2)\psi(1,1/2)-80\psi(1,3/2)+80\psi(1,9/5)$$
$$-24\psi(2,3/2)\big) \tag{67}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+4)^2} = \frac{1}{1728}\big(351+1280\gamma\psi(0,1/2)+640\psi(0,1/2)^2-1280\gamma\psi(0,4/5)-640\psi(0,4/5)^2$$
$$+192\gamma\psi(1,1/2)+192\psi(0,1/2)\psi(1,1/2)+192\gamma\psi(1,4/5)+192\psi(0,4/5)\psi(1,4/5)$$
$$-640\psi(1,3/2)+640\psi(1,9/5)-96\psi(2,3/2)-96\psi(2,9/5)\big) \tag{68}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^2(5k+4)^3} = \frac{1}{69120}\big(4185+51200\gamma\psi(0,1/2)+25600\psi(0,1/2)^2-51200\gamma\psi(0,4/5)$$
$$-25600\psi(0,4/5)^2+5120\gamma\psi(1,1/2)+5120\psi(0,1/2)\psi(1,1/2)+10240\gamma\psi(1,4/5)$$
$$+10240\psi(0,4/5)\psi(1,4/5)-768\psi(1,4/5)^2-768\gamma\psi(2,4/5)-768\psi(0,4/5)\psi(2,4/5)$$
$$-25600\psi(1,3/2)+25600\psi(1,9/5)-2560\psi(2,3/2)-5120\psi(2,9/5)+384\psi(3,9/5)\big) \tag{69}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(3k+1)} = \frac{1}{8}\big(84+72\gamma\psi(0,1/2)+36\psi(0,1/2)^2-72\gamma\psi(0,1/3)-36\psi(0,1/3)^2$$
$$-12\gamma\psi(1,1/2)-12\psi(0,1/2)\psi(1,1/2)-1\psi(1,1/2)^2+1\gamma\psi(2,1/2)$$
$$+1\psi(0,1/2)\psi(2,1/2)-36\psi(1,3/2)+36\psi(1,4/3)+6\psi(2,3/2)\big) \tag{70}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(3k+1)^2} = \frac{1}{4}\big(-24-216\gamma\psi(0,1/2)-108\psi(0,1/2)^2+216\gamma\psi(0,1/3)+108\psi(0,1/3)^2$$
$$+24\gamma\psi(1,1/2)+24\psi(0,1/2)\psi(1,1/2)+1\psi(1,1/2)^2+12\gamma\psi(1,1/3)$$
$$+12\psi(0,1/3)\psi(1,1/3)-1\gamma\psi(2,1/2)-1\psi(0,1/2)\psi(2,1/2)+108\psi(1,3/2)$$
$$-108\psi(1,4/3)-12\psi(2,3/2)-6\psi(2,4/3)\big) \tag{71}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(3k+1)^3} = \frac{1}{4}\big(126+864\gamma\psi(0,1/2)+432\psi(0,1/2)^2-864\gamma\psi(0,1/3)-432\psi(0,1/3)^2$$
$$-72\gamma\psi(1,1/2)-72\psi(0,1/2)\psi(1,1/2)-2\psi(1,1/2)^2-72\gamma\psi(1,1/3)$$
$$-72\psi(0,1/3)\psi(1,1/3)-2\psi(1,1/3)^2+2\gamma\psi(2,1/2)+2\psi(0,1/2)\psi(2,1/2)$$
$$-2\gamma\psi(2,1/3)-2\psi(0,1/3)\psi(2,1/3)-432\psi(1,3/2)+432\psi(1,4/3)+36\psi(2,3/2)$$
$$+36\psi(2,4/3)+1\psi(3,4/3)\big) \tag{72}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(3k+2)} = \frac{1}{8}\big(-33-72\gamma\psi(0,1/2)-36\psi(0,1/2)^2+72\gamma\psi(0,2/3)+36\psi(0,2/3)^2$$
$$-12\gamma\psi(1,1/2)-12\psi(0,1/2)\psi(1,1/2)+1\psi(1,1/2)^2-1\gamma\psi(2,1/2)$$
$$-1\psi(0,1/2)\psi(2,1/2)+36\psi(1,3/2)-36\psi(1,5/3)+6\psi(2,3/2)\big) \tag{73}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(3k+2)^2} = \frac{1}{8}\big(87 + 432\gamma\psi(0,1/2) + 216\psi(0,1/2)^2 - 432\gamma\psi(0,2/3) - 216\psi(0,2/3)^2$$
$$+48\gamma\psi(1,1/2) + 48\psi(0,1/2)\psi(1,1/2) - 2\psi(1,1/2)^2 + 24\gamma\psi(1,2/3)$$
$$+24\psi(0,2/3)\psi(1,2/3) + 2\gamma\psi(2,1/2) + 2\psi(0,1/2)\psi(2,1/2) - 216\psi(1,3/2)$$
$$+216\psi(1,5/3) - 24\psi(2,3/2) - 12\psi(2,5/3)\big) \tag{74}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(3k+2)^3} = \frac{1}{32}\big(747 + 6912\gamma\psi(0,1/2) + 3456\psi(0,1/2)^2 - 6912\gamma\psi(0,2/3) - 3456\psi(0,2/3)^2$$
$$+576\gamma\psi(1,1/2) + 576\psi(0,1/2)\psi(1,1/2) - 16\psi(1,1/2)^2 + 576\gamma\psi(1,2/3)$$
$$+576\psi(0,2/3)\psi(1,2/3) - 16\psi(1,2/3)^2 + 16\gamma\psi(2,1/2) + 16\psi(0,1/2)\psi(2,1/2)$$
$$-16\gamma\psi(2,2/3) - 16\psi(0,2/3)\psi(2,2/3) - 3456\psi(1,3/2) + 3456\psi(1,5/3) - 288\psi(2,3/2)$$
$$-288\psi(2,5/3) + 8\psi(3,5/3)\big) \tag{75}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(4k+1)} = \frac{1}{16}\big(128 + 32\gamma\psi(0,1/2) + 16\psi(0,1/2)^2 - 32\gamma\psi(0,1/4) - 16\psi(0,1/4)^2$$
$$-8\gamma\psi(1,1/2) - 8\psi(0,1/2)\psi(1,1/2) - 1\psi(1,1/2)^2 + 1\gamma\psi(2,1/2)$$
$$+1\psi(0,1/2)\psi(2,1/2) - 16\psi(1,3/2) + 16\psi(1,5/4) + 4\psi(2,3/2)\big) \tag{76}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(4k+1)^2} = \frac{1}{16}\big(64 - 96\gamma\psi(0,1/2) - 48\psi(0,1/2)^2 + 96\gamma\psi(0,1/4) + 48\psi(0,1/4)^2$$
$$+16\gamma\psi(1,1/2) + 16\psi(0,1/2)\psi(1,1/2) + 1\psi(1,1/2)^2 + 8\gamma\psi(1,1/4)$$
$$+8\psi(0,1/4)\psi(1,1/4) - 1\gamma\psi(2,1/2) - 1\psi(0,1/2)\psi(2,1/2) + 48\psi(1,3/2)$$
$$-48\psi(1,5/4) - 8\psi(2,3/2) - 4\psi(2,5/4)\big) \tag{77}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(4k+1)^3} = \frac{1}{32}\big(384 + 384\gamma\psi(0,1/2) + 192\psi(0,1/2)^2 - 384\gamma\psi(0,1/4) - 192\psi(0,1/4)^2$$
$$-48\gamma\psi(1,1/2) - 48\psi(0,1/2)\psi(1,1/2) - 2\psi(1,1/2)^2 - 48\gamma\psi(1,1/4)$$
$$-48\psi(0,1/4)\psi(1,1/4) - 2\psi(1,1/4)^2 + 2\gamma\psi(2,1/2) + 2\psi(0,1/2)\psi(2,1/2)$$
$$-2\gamma\psi(2,1/4) - 2\psi(0,1/4)\psi(2,1/4) - 192\psi(1,3/2) + 192\psi(1,5/4) + 24\psi(2,3/2)$$
$$+24\psi(2,5/4) + 1\psi(3,5/4)\big) \tag{78}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(4k+3)} = \frac{1}{144}\big(-256 - 288\gamma\psi(0,1/2) - 144\psi(0,1/2)^2 + 288\gamma\psi(0,3/4) + 144\psi(0,3/4)^2$$
$$-72\gamma\psi(1,1/2) - 72\psi(0,1/2)\psi(1,1/2) + 9\psi(1,1/2)^2 - 9\gamma\psi(2,1/2)$$
$$-9\psi(0,1/2)\psi(2,1/2) + 144\psi(1,3/2) - 144\psi(1,7/4) + 36\psi(2,3/2)\big) \tag{79}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(4k+3)^2} = \frac{1}{432}\big(-1088 - 2592\gamma\psi(0,1/2) - 1296\psi(0,1/2)^2 + 2592\gamma\psi(0,3/4) + 1296\psi(0,3/4)^2$$
$$-432\gamma\psi(1,1/2) - 432\psi(0,1/2)\psi(1,1/2) + 27\psi(1,1/2)^2 - 216\gamma\psi(1,3/4)$$
$$-216\psi(0,3/4)\psi(1,3/4) - 27\gamma\psi(2,1/2) - 27\psi(0,1/2)\psi(2,1/2) + 1296\psi(1,3/2)$$
$$-1296\psi(1,7/4) + 216\psi(2,3/2) + 108\psi(2,7/4)\big) \tag{80}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(4k+3)^3}=\frac{1}{864}\left(2432+10368\gamma\psi(0,1/2)+5184\psi(0,1/2)^2-10368\gamma\psi(0,3/4)-5184\psi(0,3/4)^2\right.$$
$$+1296\gamma\psi(1,1/2)+1296\psi(0,1/2)\psi(1,1/2)-54\psi(1,1/2)^2+1296\gamma\psi(1,3/4)$$
$$+1296\psi(0,3/4)\psi(1,3/4)-54\psi(1,3/4)^2+54\gamma\psi(2,1/2)+54\psi(0,1/2)\psi(2,1/2)$$
$$-54\gamma\psi(2,3/4)-54\psi(0,3/4)\psi(2,3/4)-5184\psi(1,3/2)+5184\psi(1,7/4)-648\psi(2,3/2)$$
$$\left.-648\psi(2,7/4)+27\psi(3,7/4)\right) \tag{81}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(5k+1)}=\frac{1}{216}\left(1620+200\gamma\psi(0,1/2)+100\psi(0,1/2)^2-200\gamma\psi(0,1/5)-100\psi(0,1/5)^2\right.$$
$$-60\gamma\psi(1,1/2)-60\psi(0,1/2)\psi(1,1/2)-9\psi(1,1/2)^2+9\gamma\psi(2,1/2)$$
$$\left.+9\psi(0,1/2)\psi(2,1/2)-100\psi(1,3/2)+100\psi(1,6/5)+30\psi(2,3/2)\right) \tag{82}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(5k+1)^2}=\frac{1}{108}\left(720-200\gamma\psi(0,1/2)-100\psi(0,1/2)^2+200\gamma\psi(0,1/5)+100\psi(0,1/5)^2\right.$$
$$+40\gamma\psi(1,1/2)+40\psi(0,1/2)\psi(1,1/2)+3\psi(1,1/2)^2+20\gamma\psi(1,1/5)$$
$$+20\psi(0,1/5)\psi(1,1/5)-3\gamma\psi(2,1/2)-3\psi(0,1/2)\psi(2,1/2)+100\psi(1,3/2)$$
$$\left.-100\psi(1,6/5)-20\psi(2,3/2)-10\psi(2,6/5)\right) \tag{83}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(5k+1)^3}=\frac{1}{324}\left(3690+800\gamma\psi(0,1/2)+400\psi(0,1/2)^2-800\gamma\psi(0,1/5)-400\psi(0,1/5)^2\right.$$
$$-120\gamma\psi(1,1/2)-120\psi(0,1/2)\psi(1,1/2)-6\psi(1,1/2)^2-120\gamma\psi(1,1/5)$$
$$-120\psi(0,1/5)\psi(1,1/5)-6\psi(1,1/5)^2+6\gamma\psi(2,1/2)+6\psi(0,1/2)\psi(2,1/2)$$
$$-6\gamma\psi(2,1/5)-6\psi(0,1/5)\psi(2,1/5)-400\psi(1,3/2)+400\psi(1,6/5)+60\psi(2,3/2)$$
$$\left.+60\psi(2,6/5)+3\psi(3,6/5)\right) \tag{84}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(5k+2)}=\frac{1}{8}\left(65+200\gamma\psi(0,1/2)+100\psi(0,1/2)^2-200\gamma\psi(0,2/5)-100\psi(0,2/5)^2\right.$$
$$-20\gamma\psi(1,1/2)-20\psi(0,1/2)\psi(1,1/2)-1\psi(1,1/2)^2+1\gamma\psi(2,1/2)$$
$$\left.+1\psi(0,1/2)\psi(2,1/2)-100\psi(1,3/2)+100\psi(1,7/5)+10\psi(2,3/2)\right) \tag{85}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(5k+2)^2}=\frac{1}{8}\left(-85-1200\gamma\psi(0,1/2)-600\psi(0,1/2)^2+1200\gamma\psi(0,2/5)+600\psi(0,2/5)^2\right.$$
$$+80\gamma\psi(1,1/2)+80\psi(0,1/2)\psi(1,1/2)+2\psi(1,1/2)^2+40\gamma\psi(1,2/5)$$
$$+40\psi(0,2/5)\psi(1,2/5)-2\gamma\psi(2,1/2)-2\psi(0,1/2)\psi(2,1/2)+600\psi(1,3/2)$$
$$\left.-600\psi(1,7/5)-40\psi(2,3/2)-20\psi(2,7/5)\right) \tag{86}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(2k+1)^3(5k+2)^3}=\frac{1}{32}\left(795+19200\gamma\psi(0,1/2)+9600\psi(0,1/2)^2-19200\gamma\psi(0,2/5)-9600\psi(0,2/5)^2\right.$$
$$-960\gamma\psi(1,1/2)-960\psi(0,1/2)\psi(1,1/2)-16\psi(1,1/2)^2-960\gamma\psi(1,2/5)$$
$$-960\psi(0,2/5)\psi(1,2/5)-16\psi(1,2/5)^2+16\gamma\psi(2,1/2)+16\psi(0,1/2)\psi(2,1/2)$$
$$-16\gamma\psi(2,2/5)-16\psi(0,2/5)\psi(2,2/5)-9600\psi(1,3/2)+9600\psi(1,7/5)+480\psi(2,3/2)$$
$$\left.+480\psi(2,7/5)+8\psi(3,7/5)\right) \tag{87}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(5k+3)} = \frac{1}{72}\left(340 + 1800\gamma\psi(0,1/2) + 900\psi(0,1/2)^2 - 1800\gamma\psi(0,3/5) - 900\psi(0,3/5)^2\right.$$
$$+180\gamma\psi(1,1/2) + 180\psi(0,1/2)\psi(1,1/2) - 9\psi(1,1/2)^2 + 9\gamma\psi(2,1/2)$$
$$\left.+9\psi(0,1/2)\psi(2,1/2) - 900\psi(1,3/2) + 900\psi(1,8/5) - 90\psi(2,3/2)\right) \quad (88)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(5k+3)^2} = \frac{1}{108}\left(1240 + 16200\gamma\psi(0,1/2) + 8100\psi(0,1/2)^2 - 16200\gamma\psi(0,3/5) - 8100\psi(0,3/5)^2\right.$$
$$+1080\gamma\psi(1,1/2) + 1080\psi(0,1/2)\psi(1,1/2) - 27\psi(1,1/2)^2 + 540\gamma\psi(1,3/5)$$
$$+540\psi(0,3/5)\psi(1,3/5) + 27\gamma\psi(2,1/2) + 27\psi(0,1/2)\psi(2,1/2) - 8100\psi(1,3/2)$$
$$\left.+8100\psi(1,8/5) - 540\psi(2,3/2) - 270\psi(2,8/5)\right) \quad (89)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(5k+3)^3} = \frac{1}{108}\left(-2570 - 64800\gamma\psi(0,1/2) - 32400\psi(0,1/2)^2 + 64800\gamma\psi(0,3/5) + 32400\psi(0,3/5)^2\right.$$
$$-3240\gamma\psi(1,1/2) - 3240\psi(0,1/2)\psi(1,1/2) + 54\psi(1,1/2)^2 - 3240\gamma\psi(1,3/5)$$
$$-3240\psi(0,3/5)\psi(1,3/5) + 54\psi(1,3/5)^2 - 54\gamma\psi(2,1/2) - 54\psi(0,1/2)\psi(2,1/2)$$
$$+54\gamma\psi(2,3/5) + 54\psi(0,3/5)\psi(2,3/5) + 32400\psi(1,3/2) - 32400\psi(1,8/5)$$
$$\left.+1620\psi(2,3/2) + 1620\psi(2,8/5) - 27\psi(3,8/5)\right) \quad (90)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(5k+4)} = \frac{1}{864}\left(945 + 800\gamma\psi(0,1/2) + 400\psi(0,1/2)^2 - 800\gamma\psi(0,4/5) - 400\psi(0,4/5)^2\right.$$
$$+240\gamma\psi(1,1/2) + 240\psi(0,1/2)\psi(1,1/2) - 36\psi(1,1/2)^2 + 36\gamma\psi(2,1/2)$$
$$\left.+36\psi(0,1/2)\psi(2,1/2) - 400\psi(1,3/2) + 400\psi(1,9/5) - 120\psi(2,3/2)\right) \quad (91)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(5k+4)^2} = \frac{1}{1728}\left(-1845 - 3200\gamma\psi(0,1/2) - 1600\psi(0,1/2)^2 + 3200\gamma\psi(0,4/5) + 1600\psi(0,4/5)^2\right.$$
$$-640\gamma\psi(1,1/2) - 640\psi(0,1/2)\psi(1,1/2) + 48\psi(1,1/2)^2 - 320\gamma\psi(1,4/5)$$
$$-320\psi(0,4/5)\psi(1,4/5) - 48\gamma\psi(2,1/2) - 48\psi(0,1/2)\psi(2,1/2) + 1600\psi(1,3/2)$$
$$\left.-1600\psi(1,9/5) + 320\psi(2,3/2) + 160\psi(2,9/5)\right) \quad (92)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(2k+1)^3(5k+4)^3} = \frac{1}{41472}\left(-33705 - 102400\gamma\psi(0,1/2) - 51200\psi(0,1/2)^2 + 102400\gamma\psi(0,4/5)\right.$$
$$+51200\psi(0,4/5)^2 - 15360\gamma\psi(1,1/2) - 15360\psi(0,1/2)\psi(1,1/2) + 768\psi(1,1/2)^2$$
$$-15360\gamma\psi(1,4/5) - 15360\psi(0,4/5)\psi(1,4/5) + 768\psi(1,4/5)^2 - 768\gamma\psi(2,1/2)$$
$$-768\psi(0,1/2)\psi(2,1/2) + 768\gamma\psi(2,4/5) + 768\psi(0,4/5)\psi(2,4/5) + 51200\psi(1,3/2)$$
$$\left.-51200\psi(1,9/5) + 7680\psi(2,3/2) + 7680\psi(2,9/5) - 384\psi(3,9/5)\right) \quad (93)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(4k+1)} = \frac{1}{2}\left(7 + 2\gamma\psi(0,1/3) + 1\psi(0,1/3)^2 - 2\gamma\psi(0,1/4) - 1\psi(0,1/4)^2 - 1\psi(1,4/3)\right.$$
$$\left.+1\psi(1,5/4)\right) \quad (94)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(4k+1)^2} = \frac{1}{8}\big(44 - 24\gamma\psi(0,1/3) - 12\psi(0,1/3)^2 + 24\gamma\psi(0,1/4) + 12\psi(0,1/4)^2 + 2\gamma\psi(1,1/4) + 2\psi(0,1/4)\psi(1,1/4) + 12\psi(1,4/3) - 12\psi(1,5/4) - 1\psi(2,5/4)\big) \tag{95}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(4k+1)^3} = \frac{1}{64}\big(480 + 576\gamma\psi(0,1/3) + 288\psi(0,1/3)^2 - 576\gamma\psi(0,1/4) - 288\psi(0,1/4)^2 - 48\gamma\psi(1,1/4) - 48\psi(0,1/4)\psi(1,1/4) - 2\psi(1,1/4)^2 - 2\gamma\psi(2,1/4) - 2\psi(0,1/4)\psi(2,1/4) - 288\psi(1,4/3) + 288\psi(1,5/4) + 24\psi(2,5/4) + 1\psi(3,5/4)\big) \tag{96}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(4k+3)} = \frac{1}{90}\big(65 - 18\gamma\psi(0,1/3) - 9\psi(0,1/3)^2 + 18\gamma\psi(0,3/4) + 9\psi(0,3/4)^2 + 9\psi(1,4/3) - 9\psi(1,7/4)\big) \tag{97}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(4k+3)^2} = \frac{1}{5400}\big(1700 - 648\gamma\psi(0,1/3) - 324\psi(0,1/3)^2 + 648\gamma\psi(0,3/4) + 324\psi(0,3/4)^2 - 270\gamma\psi(1,3/4) - 270\psi(0,3/4)\psi(1,3/4) + 324\psi(1,4/3) - 324\psi(1,7/4) + 135\psi(2,7/4)\big) \tag{98}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(4k+3)^3} = \frac{1}{216000}\big(28000 - 15552\gamma\psi(0,1/3) - 7776\psi(0,1/3)^2 + 15552\gamma\psi(0,3/4) + 7776\psi(0,3/4)^2 - 6480\gamma\psi(1,3/4) - 6480\psi(0,3/4)\psi(1,3/4) + 1350\psi(1,3/4)^2 + 1350\gamma\psi(2,3/4) + 1350\psi(0,3/4)\psi(2,3/4) + 7776\psi(1,4/3) - 7776\psi(1,7/4) + 3240\psi(2,7/4) - 675\psi(3,7/4)\big) \tag{99}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+1)} = \frac{1}{4}\big(16 + 2\gamma\psi(0,1/3) + 1\psi(0,1/3)^2 - 2\gamma\psi(0,1/5) - 1\psi(0,1/5)^2 - 1\psi(1,4/3) + 1\psi(1,6/5)\big) \tag{100}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+1)^2} = \frac{1}{40}\big(260 - 30\gamma\psi(0,1/3) - 15\psi(0,1/3)^2 + 30\gamma\psi(0,1/5) + 15\psi(0,1/5)^2 + 4\gamma\psi(1,1/5) + 4\psi(0,1/5)\psi(1,1/5) + 15\psi(1,4/3) - 15\psi(1,6/5) - 2\psi(2,6/5)\big) \tag{101}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+1)^3} = \frac{1}{400}\big(3600 + 450\gamma\psi(0,1/3) + 225\psi(0,1/3)^2 - 450\gamma\psi(0,1/5) - 225\psi(0,1/5)^2 - 60\gamma\psi(1,1/5) - 60\psi(0,1/5)\psi(1,1/5) - 4\psi(1,1/5)^2 - 4\gamma\psi(2,1/5) - 4\psi(0,1/5)\psi(2,1/5) - 225\psi(1,4/3) + 225\psi(1,6/5) + 30\psi(2,6/5) + 2\psi(3,6/5)\big) \tag{102}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+2)} = \frac{1}{8}\big(11 - 8\gamma\psi(0,1/3) - 4\psi(0,1/3)^2 + 8\gamma\psi(0,2/5) + 4\psi(0,2/5)^2 + 4\psi(1,4/3) - 4\psi(1,7/5)\big) \tag{103}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+2)^2} = \frac{1}{10}\left(10 - 30\gamma\psi(0,1/3) - 15\psi(0,1/3)^2 + 30\gamma\psi(0,2/5) + 15\psi(0,2/5)^2 \right.$$
$$\left. -2\gamma\psi(1,2/5) - 2\psi(0,2/5)\psi(1,2/5) + 15\psi(1,4/3) - 15\psi(1,7/5) + 1\psi(2,7/5)\right) \tag{104}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+2)^3} = \frac{1}{800}\left(525 - 7200\gamma\psi(0,1/3) - 3600\psi(0,1/3)^2 + 7200\gamma\psi(0,2/5) + 3600\psi(0,2/5)^2 \right.$$
$$-480\gamma\psi(1,2/5) - 480\psi(0,2/5)\psi(1,2/5) + 16\psi(1,2/5)^2 + 16\gamma\psi(2,2/5)$$
$$\left. +16\psi(0,2/5)\psi(2,2/5) + 3600\psi(1,4/3) - 3600\psi(1,7/5) + 240\psi(2,7/5) - 8\psi(3,7/5)\right) \tag{105}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+3)} = \frac{1}{72}\left(56 - 18\gamma\psi(0,1/3) - 9\psi(0,1/3)^2 + 18\gamma\psi(0,3/5) + 9\psi(0,3/5)^2 + 9\psi(1,4/3) \right.$$
$$\left. -9\psi(1,8/5)\right) \tag{106}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+3)^2} = \frac{1}{4320}\left(1520 - 810\gamma\psi(0,1/3) - 405\psi(0,1/3)^2 + 810\gamma\psi(0,3/5) + 405\psi(0,3/5)^2 \right.$$
$$-216\gamma\psi(1,3/5) - 216\psi(0,3/5)\psi(1,3/5) + 405\psi(1,4/3) - 405\psi(1,8/5)$$
$$\left. +108\psi(2,8/5)\right) \tag{107}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+3)^3} = \frac{1}{86400}\left(12800 - 12150\gamma\psi(0,1/3) - 6075\psi(0,1/3)^2 + 12150\gamma\psi(0,3/5) + 6075\psi(0,3/5)^2 \right.$$
$$-3240\gamma\psi(1,3/5) - 3240\psi(0,3/5)\psi(1,3/5) + 432\psi(1,3/5)^2 + 432\gamma\psi(2,3/5)$$
$$+432\psi(0,3/5)\psi(2,3/5) + 6075\psi(1,4/3) - 6075\psi(1,8/5) + 1620\psi(2,8/5)$$
$$\left. -216\psi(3,8/5)\right) \tag{108}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+4)} = \frac{1}{224}\left(119 - 32\gamma\psi(0,1/3) - 16\psi(0,1/3)^2 + 32\gamma\psi(0,4/5) + 16\psi(0,4/5)^2 + 16\psi(1,4/3) \right.$$
$$\left. -16\psi(1,9/5)\right) \tag{109}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+4)^2} = \frac{1}{15680}\left(2695 - 960\gamma\psi(0,1/3) - 480\psi(0,1/3)^2 + 960\gamma\psi(0,4/5) + 480\psi(0,4/5)^2 \right.$$
$$-448\gamma\psi(1,4/5) - 448\psi(0,4/5)\psi(1,4/5) + 480\psi(1,4/3) - 480\psi(1,9/5)$$
$$\left. +224\psi(2,9/5)\right) \tag{110}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)(5k+4)^3} = \frac{1}{4390400}\left(231525 - 115200\gamma\psi(0,1/3) - 57600\psi(0,1/3)^2 + 115200\gamma\psi(0,4/5) \right.$$
$$+57600\psi(0,4/5)^2 - 53760\gamma\psi(1,4/5) - 53760\psi(0,4/5)\psi(1,4/5) + 12544\psi(1,4/5)^2$$
$$+12544\gamma\psi(2,4/5) + 12544\psi(0,4/5)\psi(2,4/5) + 57600\psi(1,4/3) - 57600\psi(1,9/5)$$
$$\left. +26880\psi(2,9/5) - 6272\psi(3,9/5)\right) \tag{111}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+1)^2(4k+1)} = \frac{1}{6}\left(30 + 24\gamma\psi(0,1/3) + 12\psi(0,1/3)^2 - 24\gamma\psi(0,1/4) - 12\psi(0,1/4)^2 - 2\gamma\psi(1,1/3) \right.$$
$$\left. -2\psi(0,1/3)\psi(1,1/3) - 12\psi(1,4/3) + 12\psi(1,5/4) + 1\psi(2,4/3)\right) \tag{112}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(4k+1)^2} = \frac{1}{2}\big(14-48\gamma\psi(0,1/3)-24\psi(0,1/3)^2+48\gamma\psi(0,1/4)+24\psi(0,1/4)^2$$
$$+2\gamma\psi(1,1/3)+2\psi(0,1/3)\psi(1,1/3)+2\gamma\psi(1,1/4)+2\psi(0,1/4)\psi(1,1/4)$$
$$+24\psi(1,4/3)-24\psi(1,5/4)-1\psi(2,4/3)-1\psi(2,5/4)\big) \quad (113)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(4k+1)^3} = \frac{1}{16}\big(144+1728\gamma\psi(0,1/3)+864\psi(0,1/3)^2-1728\gamma\psi(0,1/4)-864\psi(0,1/4)^2$$
$$-48\gamma\psi(1,1/3)-48\psi(0,1/3)\psi(1,1/3)-96\gamma\psi(1,1/4)-96\psi(0,1/4)\psi(1,1/4)$$
$$-2\psi(1,1/4)^2-2\gamma\psi(2,1/4)-2\psi(0,1/4)\psi(2,1/4)-864\psi(1,4/3)+864\psi(1,5/4)$$
$$+24\psi(2,4/3)+48\psi(2,5/4)+1\psi(3,5/4)\big) \quad (114)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(4k+3)} = \frac{1}{450}\big(550+72\gamma\psi(0,1/3)+36\psi(0,1/3)^2-72\gamma\psi(0,3/4)-36\psi(0,3/4)^2$$
$$+30\gamma\psi(1,1/3)+30\psi(0,1/3)\psi(1,1/3)-36\psi(1,4/3)+36\psi(1,7/4)$$
$$-15\psi(2,4/3)\big) \quad (115)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(4k+3)^2} = \frac{1}{6750}\big(3250+1296\gamma\psi(0,1/3)+648\psi(0,1/3)^2-1296\gamma\psi(0,3/4)-648\psi(0,3/4)^2$$
$$+270\gamma\psi(1,1/3)+270\psi(0,1/3)\psi(1,1/3)+270\gamma\psi(1,3/4)+270\psi(0,3/4)\psi(1,3/4)$$
$$-648\psi(1,4/3)+648\psi(1,7/4)-135\psi(2,4/3)-135\psi(2,7/4)\big) \quad (116)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(4k+3)^3} = \frac{1}{270000}\big(50000+46656\gamma\psi(0,1/3)+23328\psi(0,1/3)^2-46656\gamma\psi(0,3/4)$$
$$-23328\psi(0,3/4)^2+6480\gamma\psi(1,1/3)+6480\psi(0,1/3)\psi(1,1/3)+12960\gamma\psi(1,3/4)$$
$$+12960\psi(0,3/4)\psi(1,3/4)-1350\psi(1,3/4)^2-1350\gamma\psi(2,3/4)-1350\psi(0,3/4)\psi(2,3/4)$$
$$-23328\psi(1,4/3)+23328\psi(1,7/4)-3240\psi(2,4/3)-6480\psi(2,7/4)+675\psi(3,7/4)\big) \quad (117)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+1)} = \frac{1}{24}\big(132+30\gamma\psi(0,1/3)+15\psi(0,1/3)^2-30\gamma\psi(0,1/5)-15\psi(0,1/5)^2$$
$$-4\gamma\psi(1,1/3)-4\psi(0,1/3)\psi(1,1/3)-15\psi(1,4/3)+15\psi(1,6/5)+2\psi(2,4/3)\big) \quad (118)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+1)^2} = \frac{1}{8}\big(64-30\gamma\psi(0,1/3)-15\psi(0,1/3)^2+30\gamma\psi(0,1/5)+15\psi(0,1/5)^2$$
$$+2\gamma\psi(1,1/3)+2\psi(0,1/3)\psi(1,1/3)+2\gamma\psi(1,1/5)+2\psi(0,1/5)\psi(1,1/5)$$
$$+15\psi(1,4/3)-15\psi(1,6/5)-1\psi(2,4/3)-1\psi(2,6/5)\big) \quad (119)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+1)^3} = \frac{1}{160}\big(1680+1350\gamma\psi(0,1/3)+675\psi(0,1/3)^2-1350\gamma\psi(0,1/5)-675\psi(0,1/5)^2$$
$$-60\gamma\psi(1,1/3)-60\psi(0,1/3)\psi(1,1/3)-120\gamma\psi(1,1/5)-120\psi(0,1/5)\psi(1,1/5)$$
$$-4\psi(1,1/5)^2-4\gamma\psi(2,1/5)-4\psi(0,1/5)\psi(2,1/5)-675\psi(1,4/3)+675\psi(1,6/5)$$
$$+30\psi(2,4/3)+60\psi(2,6/5)+2\psi(3,6/5)\big) \quad (120)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+2)}=\frac{1}{24}\left(51+120\gamma\psi(0,1/3)+60\psi(0,1/3)^2-120\gamma\psi(0,2/5)-60\psi(0,2/5)^2\right.$$
$$\left.+8\gamma\psi(1,1/3)+8\psi(0,1/3)\psi(1,1/3)-60\psi(1,4/3)+60\psi(1,7/5)-4\psi(2,4/3)\right) \tag{121}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+2)^2}=\frac{1}{8}\left(11+240\gamma\psi(0,1/3)+120\psi(0,1/3)^2-240\gamma\psi(0,2/5)-120\psi(0,2/5)^2\right.$$
$$+8\gamma\psi(1,1/3)+8\psi(0,1/3)\psi(1,1/3)+8\gamma\psi(1,2/5)+8\psi(0,2/5)\psi(1,2/5)$$
$$\left.-120\psi(1,4/3)+120\psi(1,7/5)-4\psi(2,4/3)-4\psi(2,7/5)\right) \tag{122}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+2)^3}=\frac{1}{160}\left(135+21600\gamma\psi(0,1/3)+10800\psi(0,1/3)^2-21600\gamma\psi(0,2/5)-10800\psi(0,2/5)^2\right.$$
$$+480\gamma\psi(1,1/3)+480\psi(0,1/3)\psi(1,1/3)+960\gamma\psi(1,2/5)+960\psi(0,2/5)\psi(1,2/5)$$
$$-16\psi(1,2/5)^2-16\gamma\psi(2,2/5)-16\psi(0,2/5)\psi(2,2/5)-10800\psi(1,4/3)$$
$$\left.+10800\psi(1,7/5)-240\psi(2,4/3)-480\psi(2,7/5)+8\psi(3,7/5)\right) \tag{123}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+3)}=\frac{1}{288}\left(368+90\gamma\psi(0,1/3)+45\psi(0,1/3)^2-90\gamma\psi(0,3/5)-45\psi(0,3/5)^2\right.$$
$$+24\gamma\psi(1,1/3)+24\psi(0,1/3)\psi(1,1/3)-45\psi(1,4/3)+45\psi(1,8/5)$$
$$\left.-12\psi(2,4/3)\right) \tag{124}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+3)^2}=\frac{1}{1728}\left(896+810\gamma\psi(0,1/3)+405\psi(0,1/3)^2-810\gamma\psi(0,3/5)-405\psi(0,3/5)^2\right.$$
$$+108\gamma\psi(1,1/3)+108\psi(0,1/3)\psi(1,1/3)+108\gamma\psi(1,3/5)+108\psi(0,3/5)\psi(1,3/5)$$
$$\left.-405\psi(1,4/3)+405\psi(1,8/5)-54\psi(2,4/3)-54\psi(2,8/5)\right) \tag{125}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+3)^3}=\frac{1}{69120}\left(14080+36450\gamma\psi(0,1/3)+18225\psi(0,1/3)^2-36450\gamma\psi(0,3/5)\right.$$
$$-18225\psi(0,3/5)^2+3240\gamma\psi(1,1/3)+3240\psi(0,1/3)\psi(1,1/3)+6480\gamma\psi(1,3/5)$$
$$+6480\psi(0,3/5)\psi(1,3/5)-432\psi(1,3/5)^2-432\gamma\psi(2,3/5)-432\psi(0,3/5)\psi(2,3/5)$$
$$\left.-18225\psi(1,4/3)+18225\psi(1,8/5)-1620\psi(2,4/3)-3240\psi(2,8/5)+216\psi(3,8/5)\right) \tag{126}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+4)}=\frac{1}{4704}\left(4263+480\gamma\psi(0,1/3)+240\psi(0,1/3)^2-480\gamma\psi(0,4/5)-240\psi(0,4/5)^2\right.$$
$$+224\gamma\psi(1,1/3)+224\psi(0,1/3)\psi(1,1/3)-240\psi(1,4/3)+240\psi(1,9/5)$$
$$\left.-112\psi(2,4/3)\right) \tag{127}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+4)^2}=\frac{1}{21952}\left(5831+1920\gamma\psi(0,1/3)+960\psi(0,1/3)^2-1920\gamma\psi(0,4/5)-960\psi(0,4/5)^2\right.$$
$$+448\gamma\psi(1,1/3)+448\psi(0,1/3)\psi(1,1/3)+448\gamma\psi(1,4/5)+448\psi(0,4/5)\psi(1,4/5)$$
$$\left.-960\psi(1,4/3)+960\psi(1,9/5)-224\psi(2,4/3)-224\psi(2,9/5)\right) \tag{128}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^2(5k+4)^3}=\frac{1}{6146560}\big(468195+345600\gamma\psi(0,1/3)+172800\psi(0,1/3)^2-345600\gamma\psi(0,4/5)$$
$$-172800\psi(0,4/5)^2+53760\gamma\psi(1,1/3)+53760\psi(0,1/3)\psi(1,1/3)+107520\gamma\psi(1,4/5)$$
$$+107520\psi(0,4/5)\psi(1,4/5)-12544\psi(1,4/5)^2-12544\gamma\psi(2,4/5)$$
$$-12544\psi(0,4/5)\psi(2,4/5)-172800\psi(1,4/3)+172800\psi(1,9/5)-26880\psi(2,4/3)$$
$$-53760\psi(2,9/5)+6272\psi(3,9/5)\big) \qquad (129)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(4k+1)}=\frac{1}{36}\big(234+576\gamma\psi(0,1/3)+288\psi(0,1/3)^2-576\gamma\psi(0,1/4)-288\psi(0,1/4)^2$$
$$-48\gamma\psi(1,1/3)-48\psi(0,1/3)\psi(1,1/3)+2\psi(1,1/3)^2+2\gamma\psi(2,1/3)$$
$$+2\psi(0,1/3)\psi(2,1/3)-288\psi(1,4/3)+288\psi(1,5/4)+24\psi(2,4/3)-1\psi(3,4/3)\big) \qquad (130)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(4k+1)^2}=\frac{1}{12}\big(102-1728\gamma\psi(0,1/3)-864\psi(0,1/3)^2+1728\gamma\psi(0,1/4)+864\psi(0,1/4)^2$$
$$+96\gamma\psi(1,1/3)+96\psi(0,1/3)\psi(1,1/3)-2\psi(1,1/3)^2+48\gamma\psi(1,1/4)$$
$$+48\psi(0,1/4)\psi(1,1/4)-2\gamma\psi(2,1/3)-2\psi(0,1/3)\psi(2,1/3)+864\psi(1,4/3)$$
$$-864\psi(1,5/4)-48\psi(2,4/3)-24\psi(2,5/4)+1\psi(3,4/3)\big) \qquad (131)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(4k+1)^3}=\frac{1}{4}\big(42+3456\gamma\psi(0,1/3)+1728\psi(0,1/3)^2-3456\gamma\psi(0,1/4)-1728\psi(0,1/4)^2$$
$$-144\gamma\psi(1,1/3)-144\psi(0,1/3)\psi(1,1/3)+2\psi(1,1/3)^2-144\gamma\psi(1,1/4)$$
$$-144\psi(0,1/4)\psi(1,1/4)-2\psi(1,1/4)^2+2\gamma\psi(2,1/3)+2\psi(0,1/3)\psi(2,1/3)$$
$$-2\gamma\psi(2,1/4)-2\psi(0,1/4)\psi(2,1/4)-1728\psi(1,4/3)+1728\psi(1,5/4)+72\psi(2,4/3)$$
$$+72\psi(2,5/4)-1\psi(3,4/3)+1\psi(3,5/4)\big) \qquad (132)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(4k+3)}=\frac{1}{4500}\big(7750-576\gamma\psi(0,1/3)-288\psi(0,1/3)^2+576\gamma\psi(0,3/4)+288\psi(0,3/4)^2$$
$$-240\gamma\psi(1,1/3)-240\psi(0,1/3)\psi(1,1/3)-50\psi(1,1/3)^2-50\gamma\psi(2,1/3)$$
$$-50\psi(0,1/3)\psi(2,1/3)+288\psi(1,4/3)-288\psi(1,7/4)+120\psi(2,4/3)+25\psi(3,4/3)\big) \qquad (133)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(4k+3)^2}=\frac{1}{67500}\big(43750-15552\gamma\psi(0,1/3)-7776\psi(0,1/3)^2+15552\gamma\psi(0,3/4)+7776\psi(0,3/4)^2$$
$$-4320\gamma\psi(1,1/3)-4320\psi(0,1/3)\psi(1,1/3)-450\psi(1,1/3)^2-2160\gamma\psi(1,3/4)$$
$$-2160\psi(0,3/4)\psi(1,3/4)-450\gamma\psi(2,1/3)-450\psi(0,1/3)\psi(2,1/3)+7776\psi(1,4/3)$$
$$-7776\psi(1,7/4)+2160\psi(2,4/3)+1080\psi(2,7/4)+225\psi(3,4/3)\big) \qquad (134)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(4k+3)^3}=\frac{1}{337500}\big(81250-93312\gamma\psi(0,1/3)-46656\psi(0,1/3)^2+93312\gamma\psi(0,3/4)$$
$$+46656\psi(0,3/4)^2-19440\gamma\psi(1,1/3)-19440\psi(0,1/3)\psi(1,1/3)-1350\psi(1,1/3)^2$$
$$-19440\gamma\psi(1,3/4)-19440\psi(0,3/4)\psi(1,3/4)+1350\psi(1,3/4)^2-1350\gamma\psi(2,1/3)$$
$$-1350\psi(0,1/3)\psi(2,1/3)+1350\gamma\psi(2,3/4)+1350\psi(0,3/4)\psi(2,3/4)+46656\psi(1,4/3)$$
$$-46656\psi(1,7/4)+9720\psi(2,4/3)+9720\psi(2,7/4)+675\psi(3,4/3)-675\psi(3,7/4)\big) \qquad (135)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+1)} = \frac{1}{144}\left(1008 + 450\gamma\psi(0,1/3) + 225\psi(0,1/3)^2 - 450\gamma\psi(0,1/5) - 225\psi(0,1/5)^2\right.$$
$$-60\gamma\psi(1,1/3) - 60\psi(0,1/3)\psi(1,1/3) + 4\psi(1,1/3)^2 + 4\gamma\psi(2,1/3)$$
$$\left.+4\psi(0,1/3)\psi(2,1/3) - 225\psi(1,4/3) + 225\psi(1,6/5) + 30\psi(2,4/3) - 2\psi(3,4/3)\right) \quad (136)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+1)^2} = \frac{1}{96}\left(912 - 1350\gamma\psi(0,1/3) - 675\psi(0,1/3)^2 + 1350\gamma\psi(0,1/5) + 675\psi(0,1/5)^2\right.$$
$$+120\gamma\psi(1,1/3) + 120\psi(0,1/3)\psi(1,1/3) - 4\psi(1,1/3)^2 + 60\gamma\psi(1,1/5)$$
$$+60\psi(0,1/5)\psi(1,1/5) - 4\gamma\psi(2,1/3) - 4\psi(0,1/3)\psi(2,1/3) + 675\psi(1,4/3)$$
$$\left.-675\psi(1,6/5) - 60\psi(2,4/3) - 30\psi(2,6/5) + 2\psi(3,4/3)\right) \quad (137)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+1)^3} = \frac{1}{32}\left(384 + 1350\gamma\psi(0,1/3) + 675\psi(0,1/3)^2 - 1350\gamma\psi(0,1/5) - 675\psi(0,1/5)^2\right.$$
$$-90\gamma\psi(1,1/3) - 90\psi(0,1/3)\psi(1,1/3) + 2\psi(1,1/3)^2 - 90\gamma\psi(1,1/5)$$
$$-90\psi(0,1/5)\psi(1,1/5) - 2\psi(1,1/5)^2 + 2\gamma\psi(2,1/3) + 2\psi(0,1/3)\psi(2,1/3)$$
$$-2\gamma\psi(2,1/5) - 2\psi(0,1/5)\psi(2,1/5) - 675\psi(1,4/3) + 675\psi(1,6/5) + 45\psi(2,4/3)$$
$$\left.+45\psi(2,6/5) - 1\psi(3,4/3) + 1\psi(3,6/5)\right) \quad (138)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+2)} = \frac{1}{72}\left(207 - 1800\gamma\psi(0,1/3) - 900\psi(0,1/3)^2 + 1800\gamma\psi(0,2/5) + 900\psi(0,2/5)^2\right.$$
$$-120\gamma\psi(1,1/3) - 120\psi(0,1/3)\psi(1,1/3) - 4\psi(1,1/3)^2 - 4\gamma\psi(2,1/3)$$
$$\left.-4\psi(0,1/3)\psi(2,1/3) + 900\psi(1,4/3) - 900\psi(1,7/5) + 60\psi(2,4/3) + 2\psi(3,4/3)\right) \quad (139)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+2)^2} = \frac{1}{12}\left(21 - 2700\gamma\psi(0,1/3) - 1350\psi(0,1/3)^2 + 2700\gamma\psi(0,2/5) + 1350\psi(0,2/5)^2\right.$$
$$-120\gamma\psi(1,1/3) - 120\psi(0,1/3)\psi(1,1/3) - 2\psi(1,1/3)^2 - 60\gamma\psi(1,2/5)$$
$$-60\psi(0,2/5)\psi(1,2/5) - 2\gamma\psi(2,1/3) - 2\psi(0,1/3)\psi(2,1/3) + 1350\psi(1,4/3)$$
$$\left.-1350\psi(1,7/5) + 60\psi(2,4/3) + 30\psi(2,7/5) + 1\psi(3,4/3)\right) \quad (140)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+2)^3} = \frac{1}{32}\left(33 - 43200\gamma\psi(0,1/3) - 21600\psi(0,1/3)^2 + 43200\gamma\psi(0,2/5) + 21600\psi(0,2/5)^2\right.$$
$$-1440\gamma\psi(1,1/3) - 1440\psi(0,1/3)\psi(1,1/3) - 16\psi(1,1/3)^2 - 1440\gamma\psi(1,2/5)$$
$$-1440\psi(0,2/5)\psi(1,2/5) + 16\psi(1,2/5)^2 - 16\gamma\psi(2,1/3) - 16\psi(0,1/3)\psi(2,1/3)$$
$$+16\gamma\psi(2,2/5) + 16\psi(0,2/5)\psi(2,2/5) + 21600\psi(1,4/3) - 21600\psi(1,7/5) + 720\psi(2,4/3)$$
$$\left.+720\psi(2,7/5) + 8\psi(3,4/3) - 8\psi(3,7/5)\right) \quad (141)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+3)} = \frac{1}{1152}\left(2048 - 450\gamma\psi(0,1/3) - 225\psi(0,1/3)^2 + 450\gamma\psi(0,3/5) + 225\psi(0,3/5)^2\right.$$
$$-120\gamma\psi(1,1/3) - 120\psi(0,1/3)\psi(1,1/3) - 16\psi(1,1/3)^2 - 16\gamma\psi(2,1/3)$$
$$\left.-16\psi(0,1/3)\psi(2,1/3) + 225\psi(1,4/3) - 225\psi(1,8/5) + 60\psi(2,4/3) + 8\psi(3,4/3)\right) \quad (142)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+3)^2}=\frac{1}{13824}\big(9472-12150\gamma\psi(0,1/3)-6075\psi(0,1/3)^2+12150\gamma\psi(0,3/5)+6075\psi(0,3/5)^2$$
$$-2160\gamma\psi(1,1/3)-2160\psi(0,1/3)\psi(1,1/3)-144\psi(1,1/3)^2-1080\gamma\psi(1,3/5)$$
$$-1080\psi(0,3/5)\psi(1,3/5)-144\gamma\psi(2,1/3)-144\psi(0,1/3)\psi(2,1/3)+6075\psi(1,4/3)$$
$$-6075\psi(1,8/5)+1080\psi(2,4/3)+540\psi(2,8/5)+72\psi(3,4/3)\big) \tag{143}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+3)^3}=\frac{1}{27648}\big(7168-36450\gamma\psi(0,1/3)-18225\psi(0,1/3)^2+36450\gamma\psi(0,3/5)+18225\psi(0,3/5)^2$$
$$-4860\gamma\psi(1,1/3)-4860\psi(0,1/3)\psi(1,1/3)-216\psi(1,1/3)^2-4860\gamma\psi(1,3/5)$$
$$-4860\psi(0,3/5)\psi(1,3/5)+216\psi(1,3/5)^2-216\gamma\psi(2,1/3)-216\psi(0,1/3)\psi(2,1/3)$$
$$+216\gamma\psi(2,3/5)+216\psi(0,3/5)\psi(2,3/5)+18225\psi(1,4/3)-18225\psi(1,8/5)$$
$$+2430\psi(2,4/3)+2430\psi(2,8/5)+108\psi(3,4/3)-108\psi(3,8/5)\big) \tag{144}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+4)}=\frac{1}{98784}\big(126567-7200\gamma\psi(0,1/3)-3600\psi(0,1/3)^2+7200\gamma\psi(0,4/5)+3600\psi(0,4/5)^2$$
$$-3360\gamma\psi(1,1/3)-3360\psi(0,1/3)\psi(1,1/3)-784\psi(1,1/3)^2-784\gamma\psi(2,1/3)$$
$$-784\psi(0,1/3)\psi(2,1/3)+3600\psi(1,4/3)-3600\psi(1,9/5)+1680\psi(2,4/3)$$
$$+392\psi(3,4/3)\big) \tag{145}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+4)^2}=\frac{1}{460992}\big(165669-43200\gamma\psi(0,1/3)-21600\psi(0,1/3)^2+43200\gamma\psi(0,4/5)$$
$$+21600\psi(0,4/5)^2-13440\gamma\psi(1,1/3)-13440\psi(0,1/3)\psi(1,1/3)-1568\psi(1,1/3)^2$$
$$-6720\gamma\psi(1,4/5)-6720\psi(0,4/5)\psi(1,4/5)-1568\gamma\psi(2,1/3)$$
$$-1568\psi(0,1/3)\psi(2,1/3)+21600\psi(1,4/3)-21600\psi(1,9/5)+6720\psi(2,4/3)+3360\psi(2,9/5)$$
$$+784\psi(3,4/3)\big) \tag{146}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+1)^3(5k+4)^3}=\frac{1}{8605184}\big(857157-691200\gamma\psi(0,1/3)-345600\psi(0,1/3)^2+691200\gamma\psi(0,4/5)$$
$$+345600\psi(0,4/5)^2-161280\gamma\psi(1,1/3)-161280\psi(0,1/3)\psi(1,1/3)-12544\psi(1,1/3)^2$$
$$-161280\gamma\psi(1,4/5)-161280\psi(0,4/5)\psi(1,4/5)+12544\psi(1,4/5)^2-12544\gamma\psi(2,1/3)$$
$$-12544\psi(0,1/3)\psi(2,1/3)+12544\gamma\psi(2,4/5)+12544\psi(0,4/5)\psi(2,4/5)$$
$$+345600\psi(1,4/3)-345600\psi(1,9/5)+80640\psi(2,4/3)+80640\psi(2,9/5)+6272\psi(3,4/3)$$
$$-6272\psi(3,9/5)\big) \tag{147}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(4k+1)}=\frac{1}{40}\big(55+8\gamma\psi(0,2/3)+4\psi(0,2/3)^2-8\gamma\psi(0,1/4)-4\psi(0,1/4)^2-4\psi(1,5/3)$$
$$+4\psi(1,5/4)\big) \tag{148}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(4k+1)^2}=\frac{1}{200}\left(475-24\gamma\psi(0,2/3)-12\psi(0,2/3)^2+24\gamma\psi(0,1/4)+12\psi(0,1/4)^2\right.$$
$$\left.+10\gamma\psi(1,1/4)+10\psi(0,1/4)\psi(1,1/4)+12\psi(1,5/3)-12\psi(1,5/4)-5\psi(2,5/4)\right) \tag{149}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(4k+1)^3}=\frac{1}{8000}\left(27000+576\gamma\psi(0,2/3)+288\psi(0,2/3)^2-576\gamma\psi(0,1/4)-288\psi(0,1/4)^2\right.$$
$$-240\gamma\psi(1,1/4)-240\psi(0,1/4)\psi(1,1/4)-50\psi(1,1/4)^2-50\gamma\psi(2,1/4)$$
$$\left.-50\psi(0,1/4)\psi(2,1/4)-288\psi(1,5/3)+288\psi(1,5/4)+120\psi(2,5/4)+25\psi(3,5/4)\right) \tag{150}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(4k+3)}=\frac{1}{72}\left(17-72\gamma\psi(0,2/3)-36\psi(0,2/3)^2+72\gamma\psi(0,3/4)+36\psi(0,3/4)^2+36\psi(1,5/3)\right.$$
$$\left.-36\psi(1,7/4)\right) \tag{151}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(4k+3)^2}=\frac{1}{216}\left(25-648\gamma\psi(0,2/3)-324\psi(0,2/3)^2+648\gamma\psi(0,3/4)+324\psi(0,3/4)^2\right.$$
$$-54\gamma\psi(1,3/4)-54\psi(0,3/4)\psi(1,3/4)+324\psi(1,5/3)-324\psi(1,7/4)$$
$$\left.+27\psi(2,7/4)\right) \tag{152}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(4k+3)^3}=\frac{1}{1728}\left(88-15552\gamma\psi(0,2/3)-7776\psi(0,2/3)^2+15552\gamma\psi(0,3/4)+7776\psi(0,3/4)^2\right.$$
$$-1296\gamma\psi(1,3/4)-1296\psi(0,3/4)\psi(1,3/4)+54\psi(1,3/4)^2+54\gamma\psi(2,3/4)$$
$$\left.+54\psi(0,3/4)\psi(2,3/4)+7776\psi(1,5/3)-7776\psi(1,7/4)+648\psi(2,7/4)-27\psi(3,7/4)\right) \tag{153}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+1)}=\frac{1}{56}\left(91+8\gamma\psi(0,2/3)+4\psi(0,2/3)^2-8\gamma\psi(0,1/5)-4\psi(0,1/5)^2-4\psi(1,5/3)\right.$$
$$\left.+4\psi(1,6/5)\right) \tag{154}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+1)^2}=\frac{1}{1960}\left(5635-120\gamma\psi(0,2/3)-60\psi(0,2/3)^2+120\gamma\psi(0,1/5)+60\psi(0,1/5)^2\right.$$
$$+56\gamma\psi(1,1/5)+56\psi(0,1/5)\psi(1,1/5)+60\psi(1,5/3)-60\psi(1,6/5)$$
$$\left.-28\psi(2,6/5)\right) \tag{155}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+1)^3}=\frac{1}{68600}\left(282975+1800\gamma\psi(0,2/3)+900\psi(0,2/3)^2-1800\gamma\psi(0,1/5)-900\psi(0,1/5)^2\right.$$
$$-840\gamma\psi(1,1/5)-840\psi(0,1/5)\psi(1,1/5)-196\psi(1,1/5)^2-196\gamma\psi(2,1/5)$$
$$\left.-196\psi(0,1/5)\psi(2,1/5)-900\psi(1,5/3)+900\psi(1,6/5)+420\psi(2,6/5)+98\psi(3,6/5)\right) \tag{156}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+2)}=\frac{1}{8}\left(4+2\gamma\psi(0,2/3)+1\psi(0,2/3)^2-2\gamma\psi(0,2/5)-1\psi(0,2/5)^2-1\psi(1,5/3)\right.$$
$$\left.+1\psi(1,7/5)\right) \tag{157}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+2)^2} = \frac{1}{160}\left(65-30\gamma\psi(0,2/3)-15\psi(0,2/3)^2+30\gamma\psi(0,2/5)+15\psi(0,2/5)^2\right.$$
$$\left.+8\gamma\psi(1,2/5)+8\psi(0,2/5)\psi(1,2/5)+15\psi(1,5/3)-15\psi(1,7/5)-4\psi(2,7/5)\right) \tag{158}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+2)^3} = \frac{1}{3200}\left(900+450\gamma\psi(0,2/3)+225\psi(0,2/3)^2-450\gamma\psi(0,2/5)-225\psi(0,2/5)^2\right.$$
$$-120\gamma\psi(1,2/5)-120\psi(0,2/5)\psi(1,2/5)-16\psi(1,2/5)^2-16\gamma\psi(2,2/5)$$
$$\left.-16\psi(0,2/5)\psi(2,2/5)-225\psi(1,5/3)+225\psi(1,7/5)+60\psi(2,7/5)+8\psi(3,7/5)\right) \tag{159}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+3)} = \frac{1}{72}\left(19+72\gamma\psi(0,2/3)+36\psi(0,2/3)^2-72\gamma\psi(0,3/5)-36\psi(0,3/5)^2-36\psi(1,5/3)\right.$$
$$\left.+36\psi(1,8/5)\right) \tag{160}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+3)^2} = \frac{1}{1080}\left(145-3240\gamma\psi(0,2/3)-1620\psi(0,2/3)^2+3240\gamma\psi(0,3/5)+1620\psi(0,3/5)^2\right.$$
$$+216\gamma\psi(1,3/5)+216\psi(0,3/5)\psi(1,3/5)+1620\psi(1,5/3)-1620\psi(1,8/5)$$
$$\left.-108\psi(2,8/5)\right) \tag{161}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+3)^3} = \frac{1}{5400}\left(325+48600\gamma\psi(0,2/3)+24300\psi(0,2/3)^2-48600\gamma\psi(0,3/5)-24300\psi(0,3/5)^2\right.$$
$$-3240\gamma\psi(1,3/5)-3240\psi(0,3/5)\psi(1,3/5)-108\psi(1,3/5)^2-108\gamma\psi(2,3/5)$$
$$-108\psi(0,3/5)\psi(2,3/5)-24300\psi(1,5/3)+24300\psi(1,8/5)+1620\psi(2,8/5)$$
$$\left.+54\psi(3,8/5)\right) \tag{162}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+4)} = \frac{1}{64}\left(11-32\gamma\psi(0,2/3)-16\psi(0,2/3)^2+32\gamma\psi(0,4/5)+16\psi(0,4/5)^2+16\psi(1,5/3)\right.$$
$$\left.-16\psi(1,9/5)\right) \tag{163}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+4)^2} = \frac{1}{80}\left(5-60\gamma\psi(0,2/3)-30\psi(0,2/3)^2+60\gamma\psi(0,4/5)+30\psi(0,4/5)^2-8\gamma\psi(1,4/5)\right.$$
$$\left.-8\psi(0,4/5)\psi(1,4/5)+30\psi(1,5/3)-30\psi(1,9/5)+4\psi(2,9/5)\right) \tag{164}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)(5k+4)^3} = \frac{1}{25600}\left(525-28800\gamma\psi(0,2/3)-14400\psi(0,2/3)^2+28800\gamma\psi(0,4/5)+14400\psi(0,4/5)^2\right.$$
$$-3840\gamma\psi(1,4/5)-3840\psi(0,4/5)\psi(1,4/5)+256\psi(1,4/5)^2+256\gamma\psi(2,4/5)$$
$$+256\psi(0,4/5)\psi(2,4/5)+14400\psi(1,5/3)-14400\psi(1,9/5)+1920\psi(2,9/5)$$
$$\left.-128\psi(3,9/5)\right) \tag{165}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(4k+1)} = \frac{1}{600}\left(525+96\gamma\psi(0,2/3)+48\psi(0,2/3)^2-96\gamma\psi(0,1/4)-48\psi(0,1/4)^2\right.$$
$$-40\gamma\psi(1,2/3)-40\psi(0,2/3)\psi(1,2/3)-48\psi(1,5/3)+48\psi(1,5/4)$$
$$\left.+20\psi(2,5/3)\right) \tag{166}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(4k+1)^2}=\frac{1}{1000}\left(1375-192\gamma\psi(0,2/3)-96\psi(0,2/3)^2+192\gamma\psi(0,1/4)+96\psi(0,1/4)^2\right.$$
$$+40\gamma\psi(1,2/3)+40\psi(0,2/3)\psi(1,2/3)+40\gamma\psi(1,1/4)+40\psi(0,1/4)\psi(1,1/4)$$
$$\left.+96\psi(1,5/3)-96\psi(1,5/4)-20\psi(2,5/3)-20\psi(2,5/4)\right) \tag{167}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(4k+1)^3}=\frac{1}{10000}\left(18750+1728\gamma\psi(0,2/3)+864\psi(0,2/3)^2-1728\gamma\psi(0,1/4)-864\psi(0,1/4)^2\right.$$
$$-240\gamma\psi(1,2/3)-240\psi(0,2/3)\psi(1,2/3)-480\gamma\psi(1,1/4)-480\psi(0,1/4)\psi(1,1/4)$$
$$-50\psi(1,1/4)^2-50\gamma\psi(2,1/4)-50\psi(0,1/4)\psi(2,1/4)-864\psi(1,5/3)+864\psi(1,5/4)$$
$$\left.+120\psi(2,5/3)+240\psi(2,5/4)+25\psi(3,5/4)\right) \tag{168}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(4k+3)}=\frac{1}{72}\left(13+288\gamma\psi(0,2/3)+144\psi(0,2/3)^2-288\gamma\psi(0,3/4)-144\psi(0,3/4)^2\right.$$
$$+24\gamma\psi(1,2/3)+24\psi(0,2/3)\psi(1,2/3)-144\psi(1,5/3)+144\psi(1,7/4)$$
$$\left.-12\psi(2,5/3)\right) \tag{169}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(4k+3)^2}=\frac{1}{216}\left(17+5184\gamma\psi(0,2/3)+2592\psi(0,2/3)^2-5184\gamma\psi(0,3/4)-2592\psi(0,3/4)^2\right.$$
$$+216\gamma\psi(1,2/3)+216\psi(0,2/3)\psi(1,2/3)+216\gamma\psi(1,3/4)+216\psi(0,3/4)\psi(1,3/4)$$
$$\left.-2592\psi(1,5/3)+2592\psi(1,7/4)-108\psi(2,5/3)-108\psi(2,7/4)\right) \tag{170}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(4k+3)^3}=\frac{1}{432}\left(14+46656\gamma\psi(0,2/3)+23328\psi(0,2/3)^2-46656\gamma\psi(0,3/4)-23328\psi(0,3/4)^2\right.$$
$$+1296\gamma\psi(1,2/3)+1296\psi(0,2/3)\psi(1,2/3)+2592\gamma\psi(1,3/4)$$
$$+2592\psi(0,3/4)\psi(1,3/4)-54\psi(1,3/4)^2-54\gamma\psi(2,3/4)-54\psi(0,3/4)\psi(2,3/4)$$
$$\left.-23328\psi(1,5/3)+23328\psi(1,7/4)-648\psi(2,5/3)-1296\psi(2,7/4)+27\psi(3,7/4)\right) \tag{171}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+1)}=\frac{1}{294}\left(294+30\gamma\psi(0,2/3)+15\psi(0,2/3)^2-30\gamma\psi(0,1/5)-15\psi(0,1/5)^2\right.$$
$$\left.-14\gamma\psi(1,2/3)-14\psi(0,2/3)\psi(1,2/3)-15\psi(1,5/3)+15\psi(1,6/5)+7\psi(2,5/3)\right) \tag{172}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+1)^2}=\frac{1}{2744}\left(4459-240\gamma\psi(0,2/3)-120\psi(0,2/3)^2+240\gamma\psi(0,1/5)+120\psi(0,1/5)^2\right.$$
$$+56\gamma\psi(1,2/3)+56\psi(0,2/3)\psi(1,2/3)+56\gamma\psi(1,1/5)+56\psi(0,1/5)\psi(1,1/5)$$
$$\left.+120\psi(1,5/3)-120\psi(1,6/5)-28\psi(2,5/3)-28\psi(2,6/5)\right) \tag{173}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+1)^3}=\frac{1}{48020}\left(108045+2700\gamma\psi(0,2/3)+1350\psi(0,2/3)^2-2700\gamma\psi(0,1/5)-1350\psi(0,1/5)^2\right.$$
$$-420\gamma\psi(1,2/3)-420\psi(0,2/3)\psi(1,2/3)-840\gamma\psi(1,1/5)-840\psi(0,1/5)\psi(1,1/5)$$
$$-98\psi(1,1/5)^2-98\gamma\psi(2,1/5)-98\psi(0,1/5)\psi(2,1/5)-1350\psi(1,5/3)+1350\psi(1,6/5)$$
$$\left.+210\psi(2,5/3)+420\psi(2,6/5)+49\psi(3,6/5)\right) \tag{174}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+2)}=\frac{1}{96}\left(33+30\gamma\psi(0,2/3)+15\psi(0,2/3)^2-30\gamma\psi(0,2/5)-15\psi(0,2/5)^2\right.$$
$$\left.-8\gamma\psi(1,2/3)-8\psi(0,2/3)\psi(1,2/3)-15\psi(1,5/3)+15\psi(1,7/5)+4\psi(2,5/3)\right) \tag{175}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+2)^2}=\frac{1}{64}\left(16-30\gamma\psi(0,2/3)-15\psi(0,2/3)^2+30\gamma\psi(0,2/5)+15\psi(0,2/5)^2\right.$$
$$+4\gamma\psi(1,2/3)+4\psi(0,2/3)\psi(1,2/3)+4\gamma\psi(1,2/5)+4\psi(0,2/5)\psi(1,2/5)$$
$$\left.+15\psi(1,5/3)-15\psi(1,7/5)-2\psi(2,5/3)-2\psi(2,7/5)\right) \tag{176}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+2)^3}=\frac{1}{2560}\left(420+1350\gamma\psi(0,2/3)+675\psi(0,2/3)^2-1350\gamma\psi(0,2/5)-675\psi(0,2/5)^2\right.$$
$$-120\gamma\psi(1,2/3)-120\psi(0,2/3)\psi(1,2/3)-240\gamma\psi(1,2/5)-240\psi(0,2/5)\psi(1,2/5)$$
$$-16\psi(1,2/5)^2-16\gamma\psi(2,2/5)-16\psi(0,2/5)\psi(2,2/5)-675\psi(1,5/3)+675\psi(1,7/5)$$
$$\left.+60\psi(2,5/3)+120\psi(2,7/5)+8\psi(3,7/5)\right) \tag{177}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+3)}=\frac{1}{36}\left(7+180\gamma\psi(0,2/3)+90\psi(0,2/3)^2-180\gamma\psi(0,3/5)-90\psi(0,3/5)^2\right.$$
$$\left.-12\gamma\psi(1,2/3)-12\psi(0,2/3)\psi(1,2/3)-90\psi(1,5/3)+90\psi(1,8/5)+6\psi(2,5/3)\right) \tag{178}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+3)^2}=\frac{1}{216}\left(19-6480\gamma\psi(0,2/3)-3240\psi(0,2/3)^2+6480\gamma\psi(0,3/5)+3240\psi(0,3/5)^2\right.$$
$$+216\gamma\psi(1,2/3)+216\psi(0,2/3)\psi(1,2/3)+216\gamma\psi(1,3/5)+216\psi(0,3/5)\psi(1,3/5)$$
$$\left.+3240\psi(1,5/3)-3240\psi(1,8/5)-108\psi(2,5/3)-108\psi(2,8/5)\right) \tag{179}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+3)^3}=\frac{1}{540}\left(20+72900\gamma\psi(0,2/3)+36450\psi(0,2/3)^2-72900\gamma\psi(0,3/5)-36450\psi(0,3/5)^2\right.$$
$$-1620\gamma\psi(1,2/3)-1620\psi(0,2/3)\psi(1,2/3)-3240\gamma\psi(1,3/5)$$
$$-3240\psi(0,3/5)\psi(1,3/5)-54\psi(1,3/5)^2-54\gamma\psi(2,3/5)-54\psi(0,3/5)\psi(2,3/5)$$
$$\left.-36450\psi(1,5/3)+36450\psi(1,8/5)+810\psi(2,5/3)+1620\psi(2,8/5)+27\psi(3,8/5)\right) \tag{180}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+4)}=\frac{1}{384}\left(51+480\gamma\psi(0,2/3)+240\psi(0,2/3)^2-480\gamma\psi(0,4/5)-240\psi(0,4/5)^2\right.$$
$$+64\gamma\psi(1,2/3)+64\psi(0,2/3)\psi(1,2/3)-240\psi(1,5/3)+240\psi(1,9/5)$$
$$\left.-32\psi(2,5/3)\right) \tag{181}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+4)^2}=\frac{1}{256}\left(11+960\gamma\psi(0,2/3)+480\psi(0,2/3)^2-960\gamma\psi(0,4/5)-480\psi(0,4/5)^2\right.$$
$$+64\gamma\psi(1,2/3)+64\psi(0,2/3)\psi(1,2/3)+64\gamma\psi(1,4/5)+64\psi(0,4/5)\psi(1,4/5)$$
$$\left.-480\psi(1,5/3)+480\psi(1,9/5)-32\psi(2,5/3)-32\psi(2,9/5)\right) \tag{182}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^2(5k+4)^3}=\frac{1}{10240}\big(135+86400\gamma\psi(0,2/3)+43200\psi(0,2/3)^2-86400\gamma\psi(0,4/5)-43200\psi(0,4/5)^2$$
$$+3840\gamma\psi(1,2/3)+3840\psi(0,2/3)\psi(1,2/3)+7680\gamma\psi(1,4/5)$$
$$+7680\psi(0,4/5)\psi(1,4/5)-256\psi(1,4/5)^2-256\gamma\psi(2,4/5)-256\psi(0,4/5)\psi(2,4/5)$$
$$-43200\psi(1,5/3)+43200\psi(1,9/5)-1920\psi(2,5/3)-3840\psi(2,9/5)+128\psi(3,9/5)\big) \quad (183)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(4k+1)}=\frac{1}{36000}\big(19125+4608\gamma\psi(0,2/3)+2304\psi(0,2/3)^2-4608\gamma\psi(0,1/4)-2304\psi(0,1/4)^2$$
$$-1920\gamma\psi(1,2/3)-1920\psi(0,2/3)\psi(1,2/3)+400\psi(1,2/3)^2+400\gamma\psi(2,2/3)$$
$$+400\psi(0,2/3)\psi(2,2/3)-2304\psi(1,5/3)+2304\psi(1,5/4)+960\psi(2,5/3)$$
$$-200\psi(3,5/3)\big) \quad (184)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(4k+1)^2}=\frac{1}{60000}\big(46875-13824\gamma\psi(0,2/3)-6912\psi(0,2/3)^2+13824\gamma\psi(0,1/4)+6912\psi(0,1/4)^2$$
$$+3840\gamma\psi(1,2/3)+3840\psi(0,2/3)\psi(1,2/3)-400\psi(1,2/3)^2+1920\gamma\psi(1,1/4)$$
$$+1920\psi(0,1/4)\psi(1,1/4)-400\gamma\psi(2,2/3)-400\psi(0,2/3)\psi(2,2/3)+6912\psi(1,5/3)$$
$$-6912\psi(1,5/4)-1920\psi(2,5/3)-960\psi(2,5/4)+200\psi(3,5/3)\big) \quad (185)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(4k+1)^3}=\frac{1}{100000}\big(103125+27648\gamma\psi(0,2/3)+13824\psi(0,2/3)^2-27648\gamma\psi(0,1/4)$$
$$-13824\psi(0,1/4)^2-5760\gamma\psi(1,2/3)-5760\psi(0,2/3)\psi(1,2/3)+400\psi(1,2/3)^2$$
$$-5760\gamma\psi(1,1/4)-5760\psi(0,1/4)\psi(1,1/4)-400\psi(1,1/4)^2+400\gamma\psi(2,2/3)$$
$$+400\psi(0,2/3)\psi(2,2/3)-400\gamma\psi(2,1/4)-400\psi(0,1/4)\psi(2,1/4)-13824\psi(1,5/3)$$
$$+13824\psi(1,5/4)+2880\psi(2,5/3)+2880\psi(2,5/4)-200\psi(3,5/3)+200\psi(3,5/4)\big) \quad (186)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(4k+3)}=\frac{1}{288}\big(35-4608\gamma\psi(0,2/3)-2304\psi(0,2/3)^2+4608\gamma\psi(0,3/4)+2304\psi(0,3/4)^2$$
$$-384\gamma\psi(1,2/3)-384\psi(0,2/3)\psi(1,2/3)-16\psi(1,2/3)^2-16\gamma\psi(2,2/3)$$
$$-16\psi(0,2/3)\psi(2,2/3)+2304\psi(1,5/3)-2304\psi(1,7/4)+192\psi(2,5/3)+8\psi(3,5/3)\big) \quad (187)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(4k+3)^2}=\frac{1}{864}\big(43-124416\gamma\psi(0,2/3)-62208\psi(0,2/3)^2+124416\gamma\psi(0,3/4)+62208\psi(0,3/4)^2$$
$$-6912\gamma\psi(1,2/3)-6912\psi(0,2/3)\psi(1,2/3)-144\psi(1,2/3)^2-3456\gamma\psi(1,3/4)$$
$$-3456\psi(0,3/4)\psi(1,3/4)-144\gamma\psi(2,2/3)-144\psi(0,2/3)\psi(2,2/3)+62208\psi(1,5/3)$$
$$-62208\psi(1,7/4)+3456\psi(2,5/3)+1728\psi(2,7/4)+72\psi(3,5/3)\big) \quad (188)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(4k+3)^3}=\frac{1}{864}\big(17-746496\gamma\psi(0,2/3)-373248\psi(0,2/3)^2+746496\gamma\psi(0,3/4)+373248\psi(0,3/4)^2$$
$$-31104\gamma\psi(1,2/3)-31104\psi(0,2/3)\psi(1,2/3)-432\psi(1,2/3)^2-31104\gamma\psi(1,3/4)$$
$$-31104\psi(0,3/4)\psi(1,3/4)+432\psi(1,3/4)^2-432\gamma\psi(2,2/3)-432\psi(0,2/3)\psi(2,2/3)$$
$$+432\gamma\psi(2,3/4)+432\psi(0,3/4)\psi(2,3/4)+373248\psi(1,5/3)-373248\psi(1,7/4)$$
$$+15552\psi(2,5/3)+15552\psi(2,7/4)+216\psi(3,5/3)-216\psi(3,7/4)\big) \quad (189)$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+2)^3(5k+1)} = \frac{1}{98784} \big(58653 + 7200\gamma\psi(0,2/3) + 3600\psi(0,2/3)^2 - 7200\gamma\psi(0,1/5) - 3600\psi(0,1/5)^2$$
$$-3360\gamma\psi(1,2/3) - 3360\psi(0,2/3)\psi(1,2/3) + 784\psi(1,2/3)^2 + 784\gamma\psi(2,2/3)$$
$$+784\psi(0,2/3)\psi(2,2/3) - 3600\psi(1,5/3) + 3600\psi(1,6/5) + 1680\psi(2,5/3)$$
$$-392\psi(3,5/3)\big) \tag{190}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+2)^3(5k+1)^2} = \frac{1}{230496} \big(208887 - 21600\gamma\psi(0,2/3) - 10800\psi(0,2/3)^2 + 21600\gamma\psi(0,1/5)$$
$$+10800\psi(0,1/5)^2 + 6720\gamma\psi(1,2/3) + 6720\psi(0,2/3)\psi(1,2/3) - 784\psi(1,2/3)^2$$
$$+3360\gamma\psi(1,1/5) + 3360\psi(0,1/5)\psi(1,1/5) - 784\gamma\psi(2,2/3)$$
$$-784\psi(0,2/3)\psi(2,2/3) + 10800\psi(1,5/3) - 10800\psi(1,6/5) - 3360\psi(2,5/3) - 1680\psi(2,6/5)$$
$$+392\psi(3,5/3)\big) \tag{191}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+2)^3(5k+1)^3} = \frac{1}{537824} \big(655473 + 43200\gamma\psi(0,2/3) + 21600\psi(0,2/3)^2 - 43200\gamma\psi(0,1/5)$$
$$-21600\psi(0,1/5)^2 - 10080\gamma\psi(1,2/3) - 10080\psi(0,2/3)\psi(1,2/3) + 784\psi(1,2/3)^2$$
$$-10080\gamma\psi(1,1/5) - 10080\psi(0,1/5)\psi(1,1/5) - 784\psi(1,1/5)^2 + 784\gamma\psi(2,2/3)$$
$$+784\psi(0,2/3)\psi(2,2/3) - 784\gamma\psi(2,1/5) - 784\psi(0,1/5)\psi(2,1/5) - 21600\psi(1,5/3)$$
$$+21600\psi(1,6/5) + 5040\psi(2,5/3) + 5040\psi(2,6/5) - 392\psi(3,5/3) + 392\psi(3,6/5)\big) \tag{192}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+2)^3(5k+2)} = \frac{1}{1152} \big(252 + 450\gamma\psi(0,2/3) + 225\psi(0,2/3)^2 - 450\gamma\psi(0,2/5) - 225\psi(0,2/5)^2$$
$$-120\gamma\psi(1,2/3) - 120\psi(0,2/3)\psi(1,2/3) + 16\psi(1,2/3)^2 + 16\gamma\psi(2,2/3)$$
$$+16\psi(0,2/3)\psi(2,2/3) - 225\psi(1,5/3) + 225\psi(1,7/5) + 60\psi(2,5/3) - 8\psi(3,5/3)\big) \tag{193}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+2)^3(5k+2)^2} = \frac{1}{1536} \big(228 - 1350\gamma\psi(0,2/3) - 675\psi(0,2/3)^2 + 1350\gamma\psi(0,2/5) + 675\psi(0,2/5)^2$$
$$+240\gamma\psi(1,2/3) + 240\psi(0,2/3)\psi(1,2/3) - 16\psi(1,2/3)^2 + 120\gamma\psi(1,2/5)$$
$$+120\psi(0,2/5)\psi(1,2/5) - 16\gamma\psi(2,2/3) - 16\psi(0,2/3)\psi(2,2/3) + 675\psi(1,5/3)$$
$$-675\psi(1,7/5) - 120\psi(2,5/3) - 60\psi(2,7/5) + 8\psi(3,5/3)\big) \tag{194}$$

$$\sum_{k=1}^{\infty} \frac{H(k)}{(3k+2)^3(5k+2)^3} = \frac{1}{1024} \big(96 + 1350\gamma\psi(0,2/3) + 675\psi(0,2/3)^2 - 1350\gamma\psi(0,2/5) - 675\psi(0,2/5)^2$$
$$-180\gamma\psi(1,2/3) - 180\psi(0,2/3)\psi(1,2/3) + 8\psi(1,2/3)^2 - 180\gamma\psi(1,2/5)$$
$$-180\psi(0,2/5)\psi(1,2/5) - 8\psi(1,2/5)^2 + 8\gamma\psi(2,2/3) + 8\psi(0,2/3)\psi(2,2/3)$$
$$-8\gamma\psi(2,2/5) - 8\psi(0,2/5)\psi(2,2/5) - 675\psi(1,5/3) + 675\psi(1,7/5) + 90\psi(2,5/3)$$
$$+90\psi(2,7/5) - 4\psi(3,5/3) + 4\psi(3,7/5)\big) \tag{195}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(5k+3)} = \frac{1}{288}\big(37+7200\gamma\psi(0,2/3)+3600\psi(0,2/3)^2-7200\gamma\psi(0,3/5)-3600\psi(0,3/5)^2$$
$$-480\gamma\psi(1,2/3)-480\psi(0,2/3)\psi(1,2/3)+16\psi(1,2/3)^2+16\gamma\psi(2,2/3)$$
$$+16\psi(0,2/3)\psi(2,2/3)-3600\psi(1,5/3)+3600\psi(1,8/5)+240\psi(2,5/3)-8\psi(3,5/3)\big) \tag{196}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(5k+3)^2} = \frac{1}{864}\big(47-194400\gamma\psi(0,2/3)-97200\psi(0,2/3)^2+194400\gamma\psi(0,3/5)+97200\psi(0,3/5)^2$$
$$+8640\gamma\psi(1,2/3)+8640\psi(0,2/3)\psi(1,2/3)-144\psi(1,2/3)^2+4320\gamma\psi(1,3/5)$$
$$+4320\psi(0,3/5)\psi(1,3/5)-144\gamma\psi(2,2/3)-144\psi(0,2/3)\psi(2,2/3)+97200\psi(1,5/3)$$
$$-97200\psi(1,8/5)-4320\psi(2,5/3)-2160\psi(2,8/5)+72\psi(3,5/3)\big) \tag{197}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(5k+3)^3} = \frac{1}{864}\big(19+1166400\gamma\psi(0,2/3)+583200\psi(0,2/3)^2-1166400\gamma\psi(0,3/5)$$
$$-583200\psi(0,3/5)^2-38880\gamma\psi(1,2/3)-38880\psi(0,2/3)\psi(1,2/3)+432\psi(1,2/3)^2$$
$$-38880\gamma\psi(1,3/5)-38880\psi(0,3/5)\psi(1,3/5)-432\psi(1,3/5)^2+432\gamma\psi(2,2/3)$$
$$+432\psi(0,2/3)\psi(2,2/3)-432\gamma\psi(2,3/5)-432\psi(0,3/5)\psi(2,3/5)-583200\psi(1,5/3)$$
$$+583200\psi(1,8/5)+19440\psi(2,5/3)+19440\psi(2,8/5)-216\psi(3,5/3)+216\psi(3,8/5)\big) \tag{198}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(5k+4)} = \frac{1}{2304}\big(207-7200\gamma\psi(0,2/3)-3600\psi(0,2/3)^2+7200\gamma\psi(0,4/5)+3600\psi(0,4/5)^2$$
$$-960\gamma\psi(1,2/3)-960\psi(0,2/3)\psi(1,2/3)-64\psi(1,2/3)^2-64\gamma\psi(2,2/3)$$
$$-64\psi(0,2/3)\psi(2,2/3)+3600\psi(1,5/3)-3600\psi(1,9/5)+480\psi(2,5/3)+32\psi(3,5/3)\big) \tag{199}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(5k+4)^2} = \frac{1}{768}\big(21-10800\gamma\psi(0,2/3)-5400\psi(0,2/3)^2+10800\gamma\psi(0,4/5)+5400\psi(0,4/5)^2$$
$$-960\gamma\psi(1,2/3)-960\psi(0,2/3)\psi(1,2/3)-32\psi(1,2/3)^2-480\gamma\psi(1,4/5)$$
$$-480\psi(0,4/5)\psi(1,4/5)-32\gamma\psi(2,2/3)-32\psi(0,2/3)\psi(2,2/3)+5400\psi(1,5/3)$$
$$-5400\psi(1,9/5)+480\psi(2,5/3)+240\psi(2,9/5)+16\psi(3,5/3)\big) \tag{200}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(3k+2)^3(5k+4)^3} = \frac{1}{4096}\big(33-172800\gamma\psi(0,2/3)-86400\psi(0,2/3)^2+172800\gamma\psi(0,4/5)+86400\psi(0,4/5)^2$$
$$-11520\gamma\psi(1,2/3)-11520\psi(0,2/3)\psi(1,2/3)-256\psi(1,2/3)^2-11520\gamma\psi(1,4/5)$$
$$-11520\psi(0,4/5)\psi(1,4/5)+256\psi(1,4/5)^2-256\gamma\psi(2,2/3)-256\psi(0,2/3)\psi(2,2/3)$$
$$+256\gamma\psi(2,4/5)+256\psi(0,4/5)\psi(2,4/5)+86400\psi(1,5/3)-86400\psi(1,9/5)$$
$$+5760\psi(2,5/3)+5760\psi(2,9/5)+128\psi(3,5/3)-128\psi(3,9/5)\big) \tag{201}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+1)} = \frac{1}{2}\big(9+2\gamma\psi(0,1/4)+1\psi(0,1/4)^2-2\gamma\psi(0,1/5)-1\psi(0,1/5)^2-1\psi(1,5/4)$$
$$+1\psi(1,6/5)\big) \tag{202}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+1)^2}=\frac{1}{10}\left(70-40\gamma\psi(0,1/4)-20\psi(0,1/4)^2+40\gamma\psi(0,1/5)+20\psi(0,1/5)^2\right.$$
$$\left.+2\gamma\psi(1,1/5)+2\psi(0,1/5)\psi(1,1/5)+20\psi(1,5/4)-20\psi(1,6/5)-1\psi(2,6/5)\right) \tag{203}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+1)^3}=\frac{1}{100}\left(950+1600\gamma\psi(0,1/4)+800\psi(0,1/4)^2-1600\gamma\psi(0,1/5)-800\psi(0,1/5)^2\right.$$
$$-80\gamma\psi(1,1/5)-80\psi(0,1/5)\psi(1,1/5)-2\psi(1,1/5)^2-2\gamma\psi(2,1/5)$$
$$\left.-2\psi(0,1/5)\psi(2,1/5)-800\psi(1,5/4)+800\psi(1,6/5)+40\psi(2,6/5)+1\psi(3,6/5)\right) \tag{204}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+2)}=\frac{1}{24}\left(39-8\gamma\psi(0,1/4)-4\psi(0,1/4)^2+8\gamma\psi(0,2/5)+4\psi(0,2/5)^2+4\psi(1,5/4)\right.$$
$$\left.-4\psi(1,7/5)\right) \tag{205}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+2)^2}=\frac{1}{360}\left(405-160\gamma\psi(0,1/4)-80\psi(0,1/4)^2+160\gamma\psi(0,2/5)+80\psi(0,2/5)^2\right.$$
$$-24\gamma\psi(1,2/5)-24\psi(0,2/5)\psi(1,2/5)+80\psi(1,5/4)-80\psi(1,7/5)$$
$$\left.+12\psi(2,7/5)\right) \tag{206}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+2)^3}=\frac{1}{21600}\left(15525-12800\gamma\psi(0,1/4)-6400\psi(0,1/4)^2+12800\gamma\psi(0,2/5)+6400\psi(0,2/5)^2\right.$$
$$-1920\gamma\psi(1,2/5)-1920\psi(0,2/5)\psi(1,2/5)+144\psi(1,2/5)^2+144\gamma\psi(2,2/5)$$
$$+144\psi(0,2/5)\psi(2,2/5)+6400\psi(1,5/4)-6400\psi(1,7/5)+960\psi(2,7/5)$$
$$\left.-72\psi(3,7/5)\right) \tag{207}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+3)}=\frac{1}{126}\left(119-18\gamma\psi(0,1/4)-9\psi(0,1/4)^2+18\gamma\psi(0,3/5)+9\psi(0,3/5)^2+9\psi(1,5/4)\right.$$
$$\left.-9\psi(1,8/5)\right) \tag{208}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+3)^2}=\frac{1}{13230}\left(5390-1080\gamma\psi(0,1/4)-540\psi(0,1/4)^2+1080\gamma\psi(0,3/5)+540\psi(0,3/5)^2\right.$$
$$-378\gamma\psi(1,3/5)-378\psi(0,3/5)\psi(1,3/5)+540\psi(1,5/4)-540\psi(1,8/5)$$
$$\left.+189\psi(2,8/5)\right) \tag{209}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+3)^3}=\frac{1}{102900}\left(17150-4800\gamma\psi(0,1/4)-2400\psi(0,1/4)^2+4800\gamma\psi(0,3/5)+2400\psi(0,3/5)^2\right.$$
$$-1680\gamma\psi(1,3/5)-1680\psi(0,3/5)\psi(1,3/5)+294\psi(1,3/5)^2+294\gamma\psi(2,3/5)$$
$$+294\psi(0,3/5)\psi(2,3/5)+2400\psi(1,5/4)-2400\psi(1,8/5)+840\psi(2,8/5)$$
$$\left.-147\psi(3,8/5)\right) \tag{210}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+4)}=\frac{1}{352}\left(231-32\gamma\psi(0,1/4)-16\psi(0,1/4)^2+32\gamma\psi(0,4/5)+16\psi(0,4/5)^2+16\psi(1,5/4)\right.$$
$$\left.-16\psi(1,9/5)\right) \tag{211}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+4)^2}=\frac{1}{38720}\left(7865-1280\gamma\psi(0,1/4)-640\psi(0,1/4)^2+1280\gamma\psi(0,4/5)+640\psi(0,4/5)^2\right.$$
$$-704\gamma\psi(1,4/5)-704\psi(0,4/5)\psi(1,4/5)+640\psi(1,5/4)-640\psi(1,9/5)$$
$$\left.+352\psi(2,9/5)\right) \tag{212}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)(5k+4)^3}=\frac{1}{17036800}\left(1031525-204800\gamma\psi(0,1/4)-102400\psi(0,1/4)^2+204800\gamma\psi(0,4/5)\right.$$
$$+102400\psi(0,4/5)^2-112640\gamma\psi(1,4/5)-112640\psi(0,4/5)\psi(1,4/5)+30976\psi(1,4/5)^2$$
$$+30976\gamma\psi(2,4/5)+30976\psi(0,4/5)\psi(2,4/5)+102400\psi(1,5/4)-102400\psi(1,9/5)$$
$$\left.+56320\psi(2,9/5)-15488\psi(3,9/5)\right) \tag{213}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+1)}=\frac{1}{8}\left(52+40\gamma\psi(0,1/4)+20\psi(0,1/4)^2-40\gamma\psi(0,1/5)-20\psi(0,1/5)^2\right.$$
$$\left.-2\gamma\psi(1,1/4)-2\psi(0,1/4)\psi(1,1/4)-20\psi(1,5/4)+20\psi(1,6/5)+1\psi(2,5/4)\right) \tag{214}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+1)^2}=\frac{1}{2}\left(18-80\gamma\psi(0,1/4)-40\psi(0,1/4)^2+80\gamma\psi(0,1/5)+40\psi(0,1/5)^2\right.$$
$$+2\gamma\psi(1,1/4)+2\psi(0,1/4)\psi(1,1/4)+2\gamma\psi(1,1/5)+2\psi(0,1/5)\psi(1,1/5)$$
$$\left.+40\psi(1,5/4)-40\psi(1,6/5)-1\psi(2,5/4)-1\psi(2,6/5)\right) \tag{215}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+1)^3}=\frac{1}{20}\left(230+4800\gamma\psi(0,1/4)+2400\psi(0,1/4)^2-4800\gamma\psi(0,1/5)-2400\psi(0,1/5)^2\right.$$
$$-80\gamma\psi(1,1/4)-80\psi(0,1/4)\psi(1,1/4)-160\gamma\psi(1,1/5)-160\psi(0,1/5)\psi(1,1/5)$$
$$-2\psi(1,1/5)^2-2\gamma\psi(2,1/5)-2\psi(0,1/5)\psi(2,1/5)-2400\psi(1,5/4)+2400\psi(1,6/5)$$
$$\left.+40\psi(2,5/4)+80\psi(2,6/5)+1\psi(3,6/5)\right) \tag{216}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+2)}=\frac{1}{72}\left(189+40\gamma\psi(0,1/4)+20\psi(0,1/4)^2-40\gamma\psi(0,2/5)-20\psi(0,2/5)^2\right.$$
$$\left.+6\gamma\psi(1,1/4)+6\psi(0,1/4)\psi(1,1/4)-20\psi(1,5/4)+20\psi(1,7/5)-3\psi(2,5/4)\right) \tag{217}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+2)^2}=\frac{1}{216}\left(351+320\gamma\psi(0,1/4)+160\psi(0,1/4)^2-320\gamma\psi(0,2/5)-160\psi(0,2/5)^2\right.$$
$$+24\gamma\psi(1,1/4)+24\psi(0,1/4)\psi(1,1/4)+24\gamma\psi(1,2/5)+24\psi(0,2/5)\psi(1,2/5)$$
$$\left.-160\psi(1,5/4)+160\psi(1,7/5)-12\psi(2,5/4)-12\psi(2,7/5)\right) \tag{218}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+2)^3}=\frac{1}{4320}\left(4185+12800\gamma\psi(0,1/4)+6400\psi(0,1/4)^2-12800\gamma\psi(0,2/5)-6400\psi(0,2/5)^2\right.$$
$$+640\gamma\psi(1,1/4)+640\psi(0,1/4)\psi(1,1/4)+1280\gamma\psi(1,2/5)$$
$$+1280\psi(0,2/5)\psi(1,2/5)-48\psi(1,2/5)^2-48\gamma\psi(2,2/5)-48\psi(0,2/5)\psi(2,2/5)$$
$$\left.-6400\psi(1,5/4)+6400\psi(1,7/5)-320\psi(2,5/4)-640\psi(2,7/5)+24\psi(3,7/5)\right) \tag{219}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+3)}=\frac{1}{3528}\big(5684+360\gamma\psi(0,1/4)+180\psi(0,1/4)^2-360\gamma\psi(0,3/5)-180\psi(0,3/5)^2$$
$$+126\gamma\psi(1,1/4)+126\psi(0,1/4)\psi(1,1/4)-180\psi(1,5/4)+180\psi(1,8/5)$$
$$-63\psi(2,5/4)\big) \tag{220}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+3)^2}=\frac{1}{18522}\big(11662+2160\gamma\psi(0,1/4)+1080\psi(0,1/4)^2-2160\gamma\psi(0,3/5)-1080\psi(0,3/5)^2$$
$$+378\gamma\psi(1,1/4)+378\psi(0,1/4)\psi(1,1/4)+378\gamma\psi(1,3/5)+378\psi(0,3/5)\psi(1,3/5)$$
$$-1080\psi(1,5/4)+1080\psi(1,8/5)-189\psi(2,5/4)-189\psi(2,8/5)\big) \tag{221}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+3)^3}=\frac{1}{1296540}\big(312130+129600\gamma\psi(0,1/4)+64800\psi(0,1/4)^2-129600\gamma\psi(0,3/5)$$
$$-64800\psi(0,3/5)^2+15120\gamma\psi(1,1/4)+15120\psi(0,1/4)\psi(1,1/4)+30240\gamma\psi(1,3/5)$$
$$+30240\psi(0,3/5)\psi(1,3/5)-2646\psi(1,3/5)^2-2646\gamma\psi(2,3/5)-2646\psi(0,3/5)\psi(2,3/5)$$
$$-64800\psi(1,5/4)+64800\psi(1,8/5)-7560\psi(2,5/4)-15120\psi(2,8/5)+1323\psi(3,8/5)\big) \tag{222}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+4)}=\frac{1}{3872}\big(4477+160\gamma\psi(0,1/4)+80\psi(0,1/4)^2-160\gamma\psi(0,4/5)-80\psi(0,4/5)^2$$
$$+88\gamma\psi(1,1/4)+88\psi(0,1/4)\psi(1,1/4)-80\psi(1,5/4)+80\psi(1,9/5)$$
$$-44\psi(2,5/4)\big) \tag{223}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+4)^2}=\frac{1}{85184}\big(27951+2560\gamma\psi(0,1/4)+1280\psi(0,1/4)^2-2560\gamma\psi(0,4/5)-1280\psi(0,4/5)^2$$
$$+704\gamma\psi(1,1/4)+704\psi(0,1/4)\psi(1,1/4)+704\gamma\psi(1,4/5)+704\psi(0,4/5)\psi(1,4/5)$$
$$-1280\psi(1,5/4)+1280\psi(1,9/5)-352\psi(2,5/4)-352\psi(2,9/5)\big) \tag{224}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^2(5k+4)^3}=\frac{1}{37480960}\big(3440635+614400\gamma\psi(0,1/4)+307200\psi(0,1/4)^2-614400\gamma\psi(0,4/5)$$
$$-307200\psi(0,4/5)^2+112640\gamma\psi(1,1/4)+112640\psi(0,1/4)\psi(1,1/4)$$
$$+225280\gamma\psi(1,4/5)+225280\psi(0,4/5)\psi(1,4/5)-30976\psi(1,4/5)^2-30976\gamma\psi(2,4/5)$$
$$-30976\psi(0,4/5)\psi(2,4/5)-307200\psi(1,5/4)+307200\psi(1,9/5)-56320\psi(2,5/4)$$
$$-112640\psi(2,9/5)+15488\psi(3,9/5)\big) \tag{225}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+1)}=\frac{1}{64}\big(544+1600\gamma\psi(0,1/4)+800\psi(0,1/4)^2-1600\gamma\psi(0,1/5)-800\psi(0,1/5)^2$$
$$-80\gamma\psi(1,1/4)-80\psi(0,1/4)\psi(1,1/4)+2\psi(1,1/4)^2+2\gamma\psi(2,1/4)$$
$$+2\psi(0,1/4)\psi(2,1/4)-800\psi(1,5/4)+800\psi(1,6/5)+40\psi(2,5/4)-1\psi(3,5/4)\big) \tag{226}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+1)^2}=\frac{1}{16}\big(176-4800\gamma\psi(0,1/4)-2400\psi(0,1/4)^2+4800\gamma\psi(0,1/5)+2400\psi(0,1/5)^2$$
$$+160\gamma\psi(1,1/4)+160\psi(0,1/4)\psi(1,1/4)-2\psi(1,1/4)^2+80\gamma\psi(1,1/5)$$
$$+80\psi(0,1/5)\psi(1,1/5)-2\gamma\psi(2,1/4)-2\psi(0,1/4)\psi(2,1/4)+2400\psi(1,5/4)$$
$$-2400\psi(1,6/5)-80\psi(2,5/4)-40\psi(2,6/5)+1\psi(3,5/4)\big) \tag{227}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+1)^3}=\frac{1}{4}\big(54+9600\gamma\psi(0,1/4)+4800\psi(0,1/4)^2-9600\gamma\psi(0,1/5)-4800\psi(0,1/5)^2$$
$$-240\gamma\psi(1,1/4)-240\psi(0,1/4)\psi(1,1/4)+2\psi(1,1/4)^2-240\gamma\psi(1,1/5)$$
$$-240\psi(0,1/5)\psi(1,1/5)-2\psi(1,1/5)^2+2\gamma\psi(2,1/4)+2\psi(0,1/4)\psi(2,1/4)$$
$$-2\gamma\psi(2,1/5)-2\psi(0,1/5)\psi(2,1/5)-4800\psi(1,5/4)+4800\psi(1,6/5)+120\psi(2,5/4)$$
$$+120\psi(2,6/5)-1\psi(3,5/4)+1\psi(3,6/5)\big) \tag{228}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+2)}=\frac{1}{1728}\big(6264-1600\gamma\psi(0,1/4)-800\psi(0,1/4)^2+1600\gamma\psi(0,2/5)+800\psi(0,2/5)^2$$
$$-240\gamma\psi(1,1/4)-240\psi(0,1/4)\psi(1,1/4)-18\psi(1,1/4)^2-18\gamma\psi(2,1/4)$$
$$-18\psi(0,1/4)\psi(2,1/4)+800\psi(1,5/4)-800\psi(1,7/5)+120\psi(2,5/4)+9\psi(3,5/4)\big) \tag{229}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+2)^2}=\frac{1}{432}\big(918-1600\gamma\psi(0,1/4)-800\psi(0,1/4)^2+1600\gamma\psi(0,2/5)+800\psi(0,2/5)^2$$
$$-160\gamma\psi(1,1/4)-160\psi(0,1/4)\psi(1,1/4)-6\psi(1,1/4)^2-80\gamma\psi(1,2/5)$$
$$-80\psi(0,2/5)\psi(1,2/5)-6\gamma\psi(2,1/4)-6\psi(0,1/4)\psi(2,1/4)+800\psi(1,5/4)$$
$$-800\psi(1,7/5)+80\psi(2,5/4)+40\psi(2,7/5)+3\psi(3,5/4)\big) \tag{230}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+2)^3}=\frac{1}{2592}\big(3159-25600\gamma\psi(0,1/4)-12800\psi(0,1/4)^2+25600\gamma\psi(0,2/5)+12800\psi(0,2/5)^2$$
$$-1920\gamma\psi(1,1/4)-1920\psi(0,1/4)\psi(1,1/4)-48\psi(1,1/4)^2-1920\gamma\psi(1,2/5)$$
$$-1920\psi(0,2/5)\psi(1,2/5)+48\psi(1,2/5)^2-48\gamma\psi(2,1/4)-48\psi(0,1/4)\psi(2,1/4)$$
$$+48\gamma\psi(2,2/5)+48\psi(0,2/5)\psi(2,2/5)+12800\psi(1,5/4)-12800\psi(1,7/5)+960\psi(2,5/4)$$
$$+960\psi(2,7/5)+24\psi(3,5/4)-24\psi(3,7/5)\big) \tag{231}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+3)}=\frac{1}{197568}\big(450016-14400\gamma\psi(0,1/4)-7200\psi(0,1/4)^2+14400\gamma\psi(0,3/5)+7200\psi(0,3/5)^2$$
$$-5040\gamma\psi(1,1/4)-5040\psi(0,1/4)\psi(1,1/4)-882\psi(1,1/4)^2-882\gamma\psi(2,1/4)$$
$$-882\psi(0,1/4)\psi(2,1/4)+7200\psi(1,5/4)-7200\psi(1,8/5)+2520\psi(2,5/4)$$
$$+441\psi(3,5/4)\big) \tag{232}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+3)^2}=\frac{1}{1037232}\big(883568-129600\gamma\psi(0,1/4)-64800\psi(0,1/4)^2+129600\gamma\psi(0,3/5)$$
$$+64800\psi(0,3/5)^2-30240\gamma\psi(1,1/4)-30240\psi(0,1/4)\psi(1,1/4)-2646\psi(1,1/4)^2$$
$$-15120\gamma\psi(1,3/5)-15120\psi(0,3/5)\psi(1,3/5)-2646\gamma\psi(2,1/4)$$
$$-2646\psi(0,1/4)\psi(2,1/4)+64800\psi(1,5/4)-64800\psi(1,8/5)+15120\psi(2,5/4)+7560\psi(2,8/5)$$
$$+1323\psi(3,5/4)\big) \tag{233}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+3)^3}=\frac{1}{1815156}\big(571438-259200\gamma\psi(0,1/4)-129600\psi(0,1/4)^2+259200\gamma\psi(0,3/5)$$
$$+129600\psi(0,3/5)^2-45360\gamma\psi(1,1/4)-45360\psi(0,1/4)\psi(1,1/4)-2646\psi(1,1/4)^2$$
$$-45360\gamma\psi(1,3/5)-45360\psi(0,3/5)\psi(1,3/5)+2646\psi(1,3/5)^2-2646\gamma\psi(2,1/4)$$
$$-2646\psi(0,1/4)\psi(2,1/4)+2646\gamma\psi(2,3/5)+2646\psi(0,3/5)\psi(2,3/5)+129600\psi(1,5/4)$$
$$-129600\psi(1,8/5)+22680\psi(2,5/4)+22680\psi(2,8/5)+1323\psi(3,5/4)-1323\psi(3,8/5)\big) \quad (234)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+4)}=\frac{1}{85184}\big(141086-1600\gamma\psi(0,1/4)-800\psi(0,1/4)^2+1600\gamma\psi(0,4/5)+800\psi(0,4/5)^2$$
$$-880\gamma\psi(1,1/4)-880\psi(0,1/4)\psi(1,1/4)-242\psi(1,1/4)^2-242\gamma\psi(2,1/4)$$
$$-242\psi(0,1/4)\psi(2,1/4)+800\psi(1,5/4)-800\psi(1,9/5)+440\psi(2,5/4)+121\psi(3,5/4)\big) \quad (235)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+4)^2}=\frac{1}{937024}\big(424589-19200\gamma\psi(0,1/4)-9600\psi(0,1/4)^2+19200\gamma\psi(0,4/5)$$
$$+9600\psi(0,4/5)^2-7040\gamma\psi(1,1/4)-7040\psi(0,1/4)\psi(1,1/4)-968\psi(1,1/4)^2$$
$$-3520\gamma\psi(1,4/5)-3520\psi(0,4/5)\psi(1,4/5)-968\gamma\psi(2,1/4)$$
$$-968\psi(0,1/4)\psi(2,1/4)+9600\psi(1,5/4)-9600\psi(1,9/5)+3520\psi(2,5/4)+1760\psi(2,9/5)$$
$$+484\psi(3,5/4)\big) \quad (236)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+1)^3(5k+4)^3}=\frac{1}{82458112}\big(10146213-1228800\gamma\psi(0,1/4)-614400\psi(0,1/4)^2+1228800\gamma\psi(0,4/5)$$
$$+614400\psi(0,4/5)^2-337920\gamma\psi(1,1/4)-337920\psi(0,1/4)\psi(1,1/4)-30976\psi(1,1/4)^2$$
$$-337920\gamma\psi(1,4/5)-337920\psi(0,4/5)\psi(1,4/5)+30976\psi(1,4/5)^2-30976\gamma\psi(2,1/4)$$
$$-30976\psi(0,1/4)\psi(2,1/4)+30976\gamma\psi(2,4/5)+30976\psi(0,4/5)\psi(2,4/5)$$
$$+614400\psi(1,5/4)-614400\psi(1,9/5)+168960\psi(2,5/4)+168960\psi(2,9/5)+15488\psi(3,5/4)$$
$$-15488\psi(3,9/5)\big) \quad (237)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+1)}=\frac{1}{198}\big(209+18\gamma\psi(0,3/4)+9\psi(0,3/4)^2-18\gamma\psi(0,1/5)-9\psi(0,1/5)^2-9\psi(1,7/4)$$
$$+9\psi(1,6/5)\big) \quad (238)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+1)^2}=\frac{1}{10890}\big(20570-360\gamma\psi(0,3/4)-180\psi(0,3/4)^2+360\gamma\psi(0,1/5)+180\psi(0,1/5)^2$$
$$+198\gamma\psi(1,1/5)+198\psi(0,1/5)\psi(1,1/5)+180\psi(1,7/4)-180\psi(1,6/5)$$
$$-99\psi(2,6/5)\big) \quad (239)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+1)^3}=\frac{1}{1197900}\big(3260950+14400\gamma\psi(0,3/4)+7200\psi(0,3/4)^2-14400\gamma\psi(0,1/5)$$
$$-7200\psi(0,1/5)^2-7920\gamma\psi(1,1/5)-7920\psi(0,1/5)\psi(1,1/5)-2178\psi(1,1/5)^2$$
$$-2178\gamma\psi(2,1/5)-2178\psi(0,1/5)\psi(2,1/5)-7200\psi(1,7/4)+7200\psi(1,6/5)$$
$$+3960\psi(2,6/5)+1089\psi(3,6/5)\big) \quad (240)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+2)} = \frac{1}{504}\left(161+72\gamma\psi(0,3/4)+36\psi(0,3/4)^2-72\gamma\psi(0,2/5)-36\psi(0,2/5)^2-36\psi(1,7/4)\right.$$
$$\left.+36\psi(1,7/5)\right) \tag{241}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+2)^2} = \frac{1}{17640}\left(4655-1440\gamma\psi(0,3/4)-720\psi(0,3/4)^2+1440\gamma\psi(0,2/5)+720\psi(0,2/5)^2\right.$$
$$+504\gamma\psi(1,2/5)+504\psi(0,2/5)\psi(1,2/5)+720\psi(1,7/4)-720\psi(1,7/5)$$
$$\left.-252\psi(2,7/5)\right) \tag{242}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+2)^3} = \frac{1}{2469600}\left(454475+115200\gamma\psi(0,3/4)+57600\psi(0,3/4)^2-115200\gamma\psi(0,2/5)\right.$$
$$-57600\psi(0,2/5)^2-40320\gamma\psi(1,2/5)-40320\psi(0,2/5)\psi(1,2/5)-7056\psi(1,2/5)^2$$
$$-7056\gamma\psi(2,2/5)-7056\psi(0,2/5)\psi(2,2/5)-57600\psi(1,7/4)+57600\psi(1,7/5)$$
$$\left.+20160\psi(2,7/5)+3528\psi(3,7/5)\right) \tag{243}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+3)} = \frac{1}{6}\left(1+2\gamma\psi(0,3/4)+1\psi(0,3/4)^2-2\gamma\psi(0,3/5)-1\psi(0,3/5)^2-1\psi(1,7/4)\right.$$
$$\left.+1\psi(1,8/5)\right) \tag{244}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+3)^2} = \frac{1}{810}\left(70-360\gamma\psi(0,3/4)-180\psi(0,3/4)^2+360\gamma\psi(0,3/5)+180\psi(0,3/5)^2\right.$$
$$+54\gamma\psi(1,3/5)+54\psi(0,3/5)\psi(1,3/5)+180\psi(1,7/4)-180\psi(1,8/5)$$
$$\left.-27\psi(2,8/5)\right) \tag{245}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+3)^3} = \frac{1}{24300}\left(950+14400\gamma\psi(0,3/4)+7200\psi(0,3/4)^2-14400\gamma\psi(0,3/5)-7200\psi(0,3/5)^2\right.$$
$$-2160\gamma\psi(1,3/5)-2160\psi(0,3/5)\psi(1,3/5)-162\psi(1,3/5)^2-162\gamma\psi(2,3/5)$$
$$-162\psi(0,3/5)\psi(2,3/5)-7200\psi(1,7/4)+7200\psi(1,8/5)+1080\psi(2,8/5)$$
$$\left.+81\psi(3,8/5)\right) \tag{246}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+4)} = \frac{1}{288}\left(31-288\gamma\psi(0,3/4)-144\psi(0,3/4)^2+288\gamma\psi(0,4/5)+144\psi(0,4/5)^2\right.$$
$$\left.+144\psi(1,7/4)-144\psi(1,9/5)\right) \tag{247}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+4)^2} = \frac{1}{2880}\left(115-11520\gamma\psi(0,3/4)-5760\psi(0,3/4)^2+11520\gamma\psi(0,4/5)+5760\psi(0,4/5)^2\right.$$
$$-576\gamma\psi(1,4/5)-576\psi(0,4/5)\psi(1,4/5)+5760\psi(1,7/4)-5760\psi(1,9/5)$$
$$\left.+288\psi(2,9/5)\right) \tag{248}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)(5k+4)^3} = \frac{1}{115200}\left(1525-1843200\gamma\psi(0,3/4)-921600\psi(0,3/4)^2+1843200\gamma\psi(0,4/5)\right.$$
$$+921600\psi(0,4/5)^2-92160\gamma\psi(1,4/5)-92160\psi(0,4/5)\psi(1,4/5)+2304\psi(1,4/5)^2$$
$$+2304\gamma\psi(2,4/5)+2304\psi(0,4/5)\psi(2,4/5)+921600\psi(1,7/4)-921600\psi(1,9/5)$$
$$\left.+46080\psi(2,9/5)-1152\psi(3,9/5)\right) \tag{249}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+1)}=\frac{1}{26136}\big(11132+1080\gamma\psi(0,3/4)+540\psi(0,3/4)^2-1080\gamma\psi(0,1/5)-540\psi(0,1/5)^2$$
$$-594\gamma\psi(1,3/4)-594\psi(0,3/4)\psi(1,3/4)-540\psi(1,7/4)+540\psi(1,6/5)$$
$$+297\psi(2,7/4)\big) \tag{250}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+1)^2}=\frac{1}{71874}\big(50578-2160\gamma\psi(0,3/4)-1080\psi(0,3/4)^2+2160\gamma\psi(0,1/5)+1080\psi(0,1/5)^2$$
$$+594\gamma\psi(1,3/4)+594\psi(0,3/4)\psi(1,3/4)+594\gamma\psi(1,1/5)+594\psi(0,1/5)\psi(1,1/5)$$
$$+1080\psi(1,7/4)-1080\psi(1,6/5)-297\psi(2,7/4)-297\psi(2,6/5)\big) \tag{251}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+1)^3}=\frac{1}{7906140}\big(7759730+129600\gamma\psi(0,3/4)+64800\psi(0,3/4)^2-129600\gamma\psi(0,1/5)$$
$$-64800\psi(0,1/5)^2-23760\gamma\psi(1,3/4)-23760\psi(0,3/4)\psi(1,3/4)-47520\gamma\psi(1,1/5)$$
$$-47520\psi(0,1/5)\psi(1,1/5)-6534\psi(1,1/5)^2-6534\gamma\psi(2,1/5)-6534\psi(0,1/5)\psi(2,1/5)$$
$$-64800\psi(1,7/4)+64800\psi(1,6/5)+11880\psi(2,7/4)+23760\psi(2,6/5)+3267\psi(3,6/5)\big) \tag{252}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+2)}=\frac{1}{10584}\big(1519+1080\gamma\psi(0,3/4)+540\psi(0,3/4)^2-1080\gamma\psi(0,2/5)-540\psi(0,2/5)^2$$
$$-378\gamma\psi(1,3/4)-378\psi(0,3/4)\psi(1,3/4)-540\psi(1,7/4)+540\psi(1,7/5)$$
$$+189\psi(2,7/4)\big) \tag{253}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+2)^2}=\frac{1}{74088}\big(7889-8640\gamma\psi(0,3/4)-4320\psi(0,3/4)^2+8640\gamma\psi(0,2/5)+4320\psi(0,2/5)^2$$
$$+1512\gamma\psi(1,3/4)+1512\psi(0,3/4)\psi(1,3/4)+1512\gamma\psi(1,2/5)$$
$$+1512\psi(0,2/5)\psi(1,2/5)+4320\psi(1,7/4)-4320\psi(1,7/5)-756\psi(2,7/4)$$
$$-756\psi(2,7/5)\big) \tag{254}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+2)^3}=\frac{1}{10372320}\big(732305+1036800\gamma\psi(0,3/4)+518400\psi(0,3/4)^2-1036800\gamma\psi(0,2/5)$$
$$-518400\psi(0,2/5)^2-120960\gamma\psi(1,3/4)-120960\psi(0,3/4)\psi(1,3/4)$$
$$-241920\gamma\psi(1,2/5)-241920\psi(0,2/5)\psi(1,2/5)-21168\psi(1,2/5)^2-21168\gamma\psi(2,2/5)$$
$$-21168\psi(0,2/5)\psi(2,2/5)-518400\psi(1,7/4)+518400\psi(1,7/5)+60480\psi(2,7/4)$$
$$+120960\psi(2,7/5)+10584\psi(3,7/5)\big) \tag{255}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+3)}=\frac{1}{648}\big(52+360\gamma\psi(0,3/4)+180\psi(0,3/4)^2-360\gamma\psi(0,3/5)-180\psi(0,3/5)^2$$
$$-54\gamma\psi(1,3/4)-54\psi(0,3/4)\psi(1,3/4)-180\psi(1,7/4)+180\psi(1,8/5)$$
$$+27\psi(2,7/4)\big) \tag{256}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+3)^2} = \frac{1}{54}\big(2-80\gamma\psi(0,3/4)-40\psi(0,3/4)^2+80\gamma\psi(0,3/5)+40\psi(0,3/5)^2$$
$$+6\gamma\psi(1,3/4)+6\psi(0,3/4)\psi(1,3/4)+6\gamma\psi(1,3/5)+6\psi(0,3/5)\psi(1,3/5)$$
$$+40\psi(1,7/4)-40\psi(1,8/5)-3\psi(2,7/4)-3\psi(2,8/5)\big) \tag{257}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+3)^3} = \frac{1}{14580}\big(230+43200\gamma\psi(0,3/4)+21600\psi(0,3/4)^2-43200\gamma\psi(0,3/5)-21600\psi(0,3/5)^2$$
$$-2160\gamma\psi(1,3/4)-2160\psi(0,3/4)\psi(1,3/4)-4320\gamma\psi(1,3/5)$$
$$-4320\psi(0,3/5)\psi(1,3/5)-162\psi(1,3/5)^2-162\gamma\psi(2,3/5)-162\psi(0,3/5)\psi(2,3/5)$$
$$-21600\psi(1,7/4)+21600\psi(1,8/5)+1080\psi(2,7/4)+2160\psi(2,8/5)+81\psi(3,8/5)\big) \tag{258}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+4)} = \frac{1}{864}\big(47+4320\gamma\psi(0,3/4)+2160\psi(0,3/4)^2-4320\gamma\psi(0,4/5)-2160\psi(0,4/5)^2$$
$$+216\gamma\psi(1,3/4)+216\psi(0,3/4)\psi(1,3/4)-2160\psi(1,7/4)+2160\psi(1,9/5)$$
$$-108\psi(2,7/4)\big) \tag{259}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+4)^2} = \frac{1}{1728}\big(31+69120\gamma\psi(0,3/4)+34560\psi(0,3/4)^2-69120\gamma\psi(0,4/5)-34560\psi(0,4/5)^2$$
$$+1728\gamma\psi(1,3/4)+1728\psi(0,3/4)\psi(1,3/4)+1728\gamma\psi(1,4/5)$$
$$+1728\psi(0,4/5)\psi(1,4/5)-34560\psi(1,7/4)+34560\psi(1,9/5)-864\psi(2,7/4)$$
$$-864\psi(2,9/5)\big) \tag{260}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^2(5k+4)^3} = \frac{1}{69120}\big(385+16588800\gamma\psi(0,3/4)+8294400\psi(0,3/4)^2-16588800\gamma\psi(0,4/5)$$
$$-8294400\psi(0,4/5)^2+276480\gamma\psi(1,3/4)+276480\psi(0,3/4)\psi(1,3/4)$$
$$+552960\gamma\psi(1,4/5)+552960\psi(0,4/5)\psi(1,4/5)-6912\psi(1,4/5)^2-6912\gamma\psi(2,4/5)$$
$$-6912\psi(0,4/5)\psi(2,4/5)-8294400\psi(1,7/4)+8294400\psi(1,9/5)-138240\psi(2,7/4)$$
$$-276480\psi(2,9/5)+3456\psi(3,9/5)\big) \tag{261}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+1)} = \frac{1}{255552}\big(42592+4800\gamma\psi(0,3/4)+2400\psi(0,3/4)^2-4800\gamma\psi(0,1/5)-2400\psi(0,1/5)^2$$
$$-2640\gamma\psi(1,3/4)-2640\psi(0,3/4)\psi(1,3/4)+726\psi(1,3/4)^2+726\gamma\psi(2,3/4)$$
$$+726\psi(0,3/4)\psi(2,3/4)-2400\psi(1,7/4)+2400\psi(1,6/5)+1320\psi(2,7/4)$$
$$-363\psi(3,7/4)\big) \tag{262}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+1)^2} = \frac{1}{6324912}\big(1639792-129600\gamma\psi(0,3/4)-64800\psi(0,3/4)^2+129600\gamma\psi(0,1/5)$$
$$+64800\psi(0,1/5)^2+47520\gamma\psi(1,3/4)+47520\psi(0,3/4)\psi(1,3/4)-6534\psi(1,3/4)^2$$
$$+23760\gamma\psi(1,1/5)+23760\psi(0,1/5)\psi(1,1/5)-6534\gamma\psi(2,3/4)$$
$$-6534\psi(0,3/4)\psi(2,3/4)+64800\psi(1,7/4)-64800\psi(1,6/5)-23760\psi(2,7/4)$$
$$-11880\psi(2,6/5)+3267\psi(3,7/4)\big) \tag{263}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+1)^3}=\frac{1}{17393508}\big(6119938+259200\gamma\psi(0,3/4)+129600\psi(0,3/4)^2-259200\gamma\psi(0,1/5)$$
$$-129600\psi(0,1/5)^2-71280\gamma\psi(1,3/4)-71280\psi(0,3/4)\psi(1,3/4)+6534\psi(1,3/4)^2$$
$$-71280\gamma\psi(1,1/5)-71280\psi(0,1/5)\psi(1,1/5)-6534\psi(1,1/5)^2+6534\gamma\psi(2,3/4)$$
$$+6534\psi(0,3/4)\psi(2,3/4)-6534\gamma\psi(2,1/5)-6534\psi(0,1/5)\psi(2,1/5)-129600\psi(1,7/4)$$
$$+129600\psi(1,6/5)+35640\psi(2,7/4)+35640\psi(2,6/5)-3267\psi(3,7/4)+3267\psi(3,6/5)\big) \quad (264)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+2)}=\frac{1}{592704}\big(35672+43200\gamma\psi(0,3/4)+21600\psi(0,3/4)^2-43200\gamma\psi(0,2/5)$$
$$-21600\psi(0,2/5)^2-15120\gamma\psi(1,3/4)-15120\psi(0,3/4)\psi(1,3/4)+2646\psi(1,3/4)^2$$
$$+2646\gamma\psi(2,3/4)+2646\psi(0,3/4)\psi(2,3/4)-21600\psi(1,7/4)+21600\psi(1,7/5)$$
$$+7560\psi(2,7/4)-1323\psi(3,7/4)\big) \quad (265)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+2)^2}=\frac{1}{115248}\big(4802-14400\gamma\psi(0,3/4)-7200\psi(0,3/4)^2+14400\gamma\psi(0,2/5)+7200\psi(0,2/5)^2$$
$$+3360\gamma\psi(1,3/4)+3360\psi(0,3/4)\psi(1,3/4)-294\psi(1,3/4)^2+1680\gamma\psi(1,2/5)$$
$$+1680\psi(0,2/5)\psi(1,2/5)-294\gamma\psi(2,3/4)-294\psi(0,3/4)\psi(2,3/4)+7200\psi(1,7/4)$$
$$-7200\psi(1,7/5)-1680\psi(2,7/4)-840\psi(2,7/5)+147\psi(3,7/4)\big) \quad (266)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+2)^3}=\frac{1}{14521248}\big(386561+2073600\gamma\psi(0,3/4)+1036800\psi(0,3/4)^2-2073600\gamma\psi(0,2/5)$$
$$-1036800\psi(0,2/5)^2-362880\gamma\psi(1,3/4)-362880\psi(0,3/4)\psi(1,3/4)+21168\psi(1,3/4)^2$$
$$-362880\gamma\psi(1,2/5)-362880\psi(0,2/5)\psi(1,2/5)-21168\psi(1,2/5)^2+21168\gamma\psi(2,3/4)$$
$$+21168\psi(0,3/4)\psi(2,3/4)-21168\gamma\psi(2,2/5)-21168\psi(0,2/5)\psi(2,2/5)$$
$$-1036800\psi(1,7/4)+1036800\psi(1,7/5)+181440\psi(2,7/4)+181440\psi(2,7/5)-10584\psi(3,7/4)$$
$$+10584\psi(3,7/5)\big) \quad (267)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+3)}=\frac{1}{15552}\big(544+14400\gamma\psi(0,3/4)+7200\psi(0,3/4)^2-14400\gamma\psi(0,3/5)-7200\psi(0,3/5)^2$$
$$-2160\gamma\psi(1,3/4)-2160\psi(0,3/4)\psi(1,3/4)+162\psi(1,3/4)^2+162\gamma\psi(2,3/4)$$
$$+162\psi(0,3/4)\psi(2,3/4)-7200\psi(1,7/4)+7200\psi(1,8/5)+1080\psi(2,7/4)$$
$$-81\psi(3,7/4)\big) \quad (268)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+3)^2}=\frac{1}{11664}\big(176-43200\gamma\psi(0,3/4)-21600\psi(0,3/4)^2+43200\gamma\psi(0,3/5)+21600\psi(0,3/5)^2$$
$$+4320\gamma\psi(1,3/4)+4320\psi(0,3/4)\psi(1,3/4)-162\psi(1,3/4)^2+2160\gamma\psi(1,3/5)$$
$$+2160\psi(0,3/5)\psi(1,3/5)-162\gamma\psi(2,3/4)-162\psi(0,3/4)\psi(2,3/4)+21600\psi(1,7/4)$$
$$-21600\psi(1,8/5)-2160\psi(2,7/4)-1080\psi(2,8/5)+81\psi(3,7/4)\big) \quad (269)$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+3)^3}=\frac{1}{324}\left(2+3200\gamma\psi(0,3/4)+1600\psi(0,3/4)^2-3200\gamma\psi(0,3/5)-1600\psi(0,3/5)^2\right.$$
$$-240\gamma\psi(1,3/4)-240\psi(0,3/4)\psi(1,3/4)+6\psi(1,3/4)^2-240\gamma\psi(1,3/5)$$
$$-240\psi(0,3/5)\psi(1,3/5)-6\psi(1,3/5)^2+6\gamma\psi(2,3/4)+6\psi(0,3/4)\psi(2,3/4)$$
$$-6\gamma\psi(2,3/5)-6\psi(0,3/5)\psi(2,3/5)-1600\psi(1,7/4)+1600\psi(1,8/5)+120\psi(2,7/4)$$
$$\left.+120\psi(2,8/5)-3\psi(3,7/4)+3\psi(3,8/5)\right) \tag{270}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+4)}=\frac{1}{576}\left(14-14400\gamma\psi(0,3/4)-7200\psi(0,3/4)^2+14400\gamma\psi(0,4/5)+7200\psi(0,4/5)^2\right.$$
$$-720\gamma\psi(1,3/4)-720\psi(0,3/4)\psi(1,3/4)-18\psi(1,3/4)^2-18\gamma\psi(2,3/4)$$
$$\left.-18\psi(0,3/4)\psi(2,3/4)+7200\psi(1,7/4)-7200\psi(1,9/5)+360\psi(2,7/4)+9\psi(3,7/4)\right) \tag{271}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+4)^2}=\frac{1}{1728}\left(13-518400\gamma\psi(0,3/4)-259200\psi(0,3/4)^2+518400\gamma\psi(0,4/5)\right.$$
$$+259200\psi(0,4/5)^2-17280\gamma\psi(1,3/4)-17280\psi(0,3/4)\psi(1,3/4)-216\psi(1,3/4)^2$$
$$-8640\gamma\psi(1,4/5)-8640\psi(0,4/5)\psi(1,4/5)-216\gamma\psi(2,3/4)$$
$$-216\psi(0,3/4)\psi(2,3/4)+259200\psi(1,7/4)-259200\psi(1,9/5)+8640\psi(2,7/4)+4320\psi(2,9/5)$$
$$\left.+108\psi(3,7/4)\right) \tag{272}$$

$$\sum_{k=1}^{\infty}\frac{H(k)}{(4k+3)^3(5k+4)^3}=\frac{1}{13824}\left(31-33177600\gamma\psi(0,3/4)-16588800\psi(0,3/4)^2+33177600\gamma\psi(0,4/5)\right.$$
$$+16588800\psi(0,4/5)^2-829440\gamma\psi(1,3/4)-829440\psi(0,3/4)\psi(1,3/4)-6912\psi(1,3/4)^2$$
$$-829440\gamma\psi(1,4/5)-829440\psi(0,4/5)\psi(1,4/5)+6912\psi(1,4/5)^2-6912\gamma\psi(2,3/4)$$
$$-6912\psi(0,3/4)\psi(2,3/4)+6912\gamma\psi(2,4/5)+6912\psi(0,4/5)\psi(2,4/5)$$
$$+16588800\psi(1,7/4)-16588800\psi(1,9/5)+414720\psi(2,7/4)+414720\psi(2,9/5)+3456\psi(3,7/4)$$
$$\left.-3456\psi(3,9/5)\right) \tag{273}$$