This looks like some more scrap write up that is superseded by my major write ups. Nothing too interesting here.

$$[(1-x^{1-s})\zeta_n(s)]^{*z}=\sum_{j=0}(-1)^j\binom{z}{j}x^{j(1-s)}[\zeta_{n\cdot x^{-j}}(s)]^{*z}$$

$$[(1-2^{1-s})\zeta_n(s)]^{*z}=\sum_{j=0}(-1)^j\binom{z}{j}2^{j(1-s)}[\zeta_{\frac{n}{2^j}}(s)]^{*z}$$

$$\begin{aligned}
&[(1-2^{1-s})\zeta_n(s)]^{*z}=\\
&[\zeta_n(s)]^{*z}+\\
&-z2^{1-s}[\zeta_{\frac{n}{2}}(s)]^{*z}+\\
&\frac{z(z-1)}{2}4^{1-s}[\zeta_{\frac{n}{4}}(s)]^{*z}+\\
&-\frac{z(z-1)(z-2)}{6}8^{1-s}[\zeta_{\frac{n}{8}}(s)]^{*z}\\
&+\ldots
\end{aligned}$$

$$\begin{aligned}
&[(1-2^{1-s})\zeta_n(s)]^{*z}=\\
&[\zeta_n(s)]^{*z}+\\
&-\binom{z}{1}2^{1-s}[\zeta_{\frac{n}{2}}(s)]^{*z}+\\
&\binom{z}{2}4^{1-s}[\zeta_{\frac{n}{4}}(s)]^{*z}+\\
&-\binom{z}{3}8^{1-s}[\zeta_{\frac{n}{8}}(s)]^{*z}\\
&+\ldots
\end{aligned}$$

$$[(1-x^{1-s})\zeta_{\Delta n}(s)]^{*z}=\sum_{j=0}(-1)^j\binom{z}{j}x^{j(1-s)}\left(\left\lfloor\frac{n}{x^j}\right\rfloor-\left\lfloor\frac{n-1}{x^j}\right\rfloor\right)\cdot\left\lfloor\frac{n}{x^j}\right\rfloor^{-s}\cdot d_z\left(\frac{n}{x^j}\right)$$

[(1-x^{1-s})%zeta_{%DELTA n}(s)]^{"*"z} = sum from j = 0 (-1)^j (binom{z}{j})x^{j(1-s)} (lfloor n over x^j rfloor-lfloor {n-1} over x^j rfloor) cdot lfloor n over x^j rfloor^-s cdot d_z(n over x^j)

$$e_z(n,x)=\sum_{j=0}^{\log_x n}(-1)^j\binom{z}{j}x^j\left(\left\lfloor\frac{n}{x^j}\right\rfloor-\left\lfloor\frac{n-1}{x^j}\right\rfloor\right)\cdot d_z\left(\frac{n}{x^j}\right)$$

$$\begin{aligned}
&e_z(n,2)=\\
&\binom{z}{0}\cdot d_z(n)+\\
&-\binom{z}{1}2\left(\left\lfloor\frac{n}{2}\right\rfloor-\left\lfloor\frac{n-1}{2}\right\rfloor\right)\cdot d_z\left(\frac{n}{2}\right)+\\
&\binom{z}{2}4\left(\left\lfloor\frac{n}{4}\right\rfloor-\left\lfloor\frac{n-1}{4}\right\rfloor\right)\cdot d_z\left(\frac{n}{4}\right)+\\
&\ldots
\end{aligned}$$

$$e_z(n,x)=$$
$$\binom{z}{0}\cdot d_z(n)+$$
$$-\binom{z}{1}x\left(\left\lfloor\frac{n}{x}\right\rfloor-\left\lfloor\frac{n-1}{x}\right\rfloor\right)\cdot d_z\left(\frac{n}{x}\right)+$$
$$\binom{z}{2}x^2\left(\left\lfloor\frac{n}{x^2}\right\rfloor-\left\lfloor\frac{n-1}{x^2}\right\rfloor\right)\cdot d_z\left(\frac{n}{x^2}\right)+$$
$$\ldots$$

$$\kappa e(n,x)=$$
$$\kappa(n)+$$
$$-\frac{1}{2}x\left(\left\lfloor\frac{n}{x}\right\rfloor-\left\lfloor\frac{n-1}{x}\right\rfloor\right)\cdot\kappa\left(\frac{n}{x}\right)+$$
$$\frac{1}{3}x^2\left(\left\lfloor\frac{n}{x^2}\right\rfloor-\left\lfloor\frac{n-1}{x^2}\right\rfloor\right)\cdot\kappa\left(\frac{n}{x^2}\right)+$$
$$\ldots$$

$$[\zeta_n(s,y)]^{*k}=\sum_{j=0}^{k}\binom{k}{j}[\zeta_{n\cdot y^{j-k}}(s,1+y)]^{*j}$$
$$[\zeta_n(s,1+y)]^{*k}=\sum_{j=0}^{k}(-1)^{k-j}\binom{k}{j}[\zeta_{n\,y^{j-k}}(s,y)]^{*j}$$

// ?

$$[y^{s-1}\cdot\zeta_n(s,1+y)]^{*k}=y^{k(s-1)}[\zeta_{n\cdot y^{k}}(s,1+y)]^{*k}$$

$$[\zeta_n(s,1+y)]^{*1}=\sum_{j=1}^{\lfloor n-y\rfloor}(y+j)^{-s}$$
$$[\zeta_n(s,1+y)]^{*2}=\sum_{j=1}^{\lfloor n-y\rfloor}\sum_{k=1}^{\lfloor\frac{n}{j+y}-y\rfloor}((y+j)\cdot(y+k))^{-s}$$
$$[\zeta_n(s,1+y)]^{*3}=$$
$$\sum_{j=1}^{\lfloor n-y\rfloor}\sum_{k=1}^{\lfloor\frac{n}{j+y}-y\rfloor}\sum_{l=1}^{\lfloor\frac{n}{(y+j)(y+k)}-y\rfloor}((y+j)\cdot(y+k)\cdot(y+l))^{-s}$$

$$[\zeta_n(s,1+y)]^{*1}=y^{-s}\sum_{j=1}^{\lfloor n-y\rfloor}\left(1+\frac{j}{y}\right)^{-s}$$
$$[\zeta_n(s,1+y)]^{*2}=y^{-2s}\sum_{j=1}^{\lfloor n-y\rfloor}\sum_{k=1}^{\lfloor\frac{n}{j+y}-y\rfloor}\left(\left(1+\frac{j}{y}\right)\cdot\left(1+\frac{k}{y}\right)\right)^{-s}$$
$$[\zeta_n(s,1+y)]^{*3}=$$
$$y^{-3s}\sum_{j=1}^{\lfloor n-y\rfloor}\sum_{k=1}^{\lfloor\frac{n}{j+y}-y\rfloor}\sum_{l=1}^{\lfloor\frac{n}{(y+j)(y+k)}-y\rfloor}\left(\left(1+\frac{j}{y}\right)\cdot\left(1+\frac{k}{y}\right)\cdot\left(1+\frac{l}{y}\right)\right)^{-s}$$

$$[y^{s-1}\cdot\zeta_n(s,1+y)]^{*1}=y^{-1}\sum_{j=1}^{(n-1)\cdot y}(y^{-1}\cdot(y+j))^{-s}$$
$$[y^{s-1}\cdot\zeta_n(s,1+y)]^{*2}=y^{-2}\sum_{j=1}\sum_{k=1}((y^{-1}\cdot(y+j))\cdot(y^{-1}\cdot(y+k)))^{-s}$$
$$[y^{s-1}\cdot\zeta_n(s,1+y)]^{*3}=y^{-3}\sum_{j=1}\sum_{k=1}\sum_{l=1}((y^{-1}\cdot(y+j))\cdot(y^{-1}\cdot(y+k))\cdot(y^{-1}\cdot(y+l)))^{-s}$$

// need to keep track of how n changes better here, as that is crucial.

$$[y^{s-1}\cdot\zeta_n(s,1+y)]^{*1}=y^{s-1}\sum_{j=1}^{(n-1)\cdot y}(y+j)^{-s}$$
$$[y^{s-1}\cdot\zeta_n(s,1+y)]^{*2}=y^{2(s-1)}\sum_{j=1}\sum_{k=1}((y+j)\cdot(y+k))^{-s}$$
$$[y^{s-1}\cdot\zeta_n(s,1+y)]^{*3}=y^{3(s-1)}\sum_{j=1}\sum_{k=1}\sum_{l=1}((y+j)\cdot(y+k)\cdot(y+l))^{-s}$$

$$[1+y^{s-1}\cdot\zeta_n(s,1+y)]^{*z}=$$
$$\binom{z}{0}y^0$$
$$+\binom{z}{1}y^{-1}\sum_{j=1}^{(n-1)\cdot y}\left(1+\frac{j}{y}\right)^{-s}$$
$$+\binom{z}{2}y^{-2}\sum_{j=1}\sum_{k=1}\left(\left(1+\frac{j}{y}\right)\cdot\left(1+\frac{k}{y}\right)\right)^{-s}$$
$$+\binom{z}{3}y^{-3}\sum_{j=1}\sum_{k=1}\sum_{l=1}\left(\left(1+\frac{j}{y}\right)\cdot\left(1+\frac{k}{y}\right)\cdot\left(1+\frac{l}{y}\right)\right)^{-s}$$
$$+\ldots$$

$$[\log(1+y^{s-1}\cdot\zeta_n(s,1+y))]^{*1}=$$
$$y^{-1}\sum_{j=1}^{(n-1)\cdot y}\left(1+\frac{j}{y}\right)^{-s}$$
$$-\frac{1}{2}y^{-2}\sum_{j=1}\sum_{k=1}\left(\left(1+\frac{j}{y}\right)\cdot\left(1+\frac{k}{y}\right)\right)^{-s}$$
$$+\frac{1}{3}y^{-3}\sum_{j=1}\sum_{k=1}\sum_{l=1}\left(\left(1+\frac{j}{y}\right)\cdot\left(1+\frac{k}{y}\right)\cdot\left(1+\frac{l}{y}\right)\right)^{-s}$$
$$-\ldots$$

$$[1+y^{s-1}\cdot\zeta_n(s,1+y)]^{*z}=$$
$$\binom{z}{0}y^0$$
$$+\binom{z}{1}y^{(s-1)}\sum_{j=1}^{(n-1)\cdot y}(y+j)^{-s}$$
$$+\binom{z}{2}y^{2(s-1)}\sum_{j=1}\sum_{k=1}((y+j)\cdot(y+k))^{-s}$$
$$+\binom{z}{3}y^{3(s-1)}\sum_{j=1}\sum_{k=1}\sum_{l=1}((y+j)\cdot(y+k)\cdot(y+l))^{-s}$$
$$+\ldots$$

$$[\log(1+y^{s-1}\cdot\zeta_n(s,1+y))]^{*1}=$$
$$+y^{(s-1)}\sum_{j=1}^{(n-1)\cdot y}(y+j)^{-s}$$
$$-\frac{1}{2}y^{2(s-1)}\sum_{j=1}\sum_{k=1}((y+j)\cdot(y+k))^{-s}$$
$$+\frac{1}{3}y^{3(s-1)}\sum_{j=1}\sum_{k=1}\sum_{l=1}((y+j)\cdot(y+k)\cdot(y+l))^{-s}$$
$$-\ldots$$

$$\boxed{[\zeta_n(0)]^{*z} = L_{-z}(\log n) - \int_1^\infty \frac{\partial}{\partial y}[1 + y^{-1}\cdot\zeta_n(0,1+y)]^{*z}\,dy}$$

$$\boxed{\begin{aligned}&\Pi(n) =\\ &li(n) - \log\log n - \gamma - \int_1^\infty \frac{\partial}{\partial y}[\log(1 + y^{-1}\cdot\zeta_n(0,1+y))]^{*1}\,dy\end{aligned}}$$

$$\begin{aligned}
&[1 + y^{-1}\cdot\zeta_n(0,1+y)]^{*z} =\\
&\binom{z}{0} y^0\\
&+\binom{z}{1} y^{-1} \sum_{j=1}^{(n-1)\cdot y} 1\\
&+\binom{z}{2} y^{-2} \sum_{j=1} \sum_{k=1} 1\\
&+\binom{z}{3} y^{-3} \sum_{j=1} \sum_{k=1} \sum_{l=1} 1\\
&+\ldots
\end{aligned}$$

$$\begin{aligned}
&[\log(1 + y^{s-1}\cdot\zeta_n(s, 1+y))]^{*1} =\\
&+ y^{(s-1)} \sum_{j=1}^{(n-1)\cdot y} (y+j)^{-s}\\
&-\frac{1}{2} y^{2(s-1)} \sum_{j=1} \sum_{k=1} ((y+j)\cdot(y+k))^{-s}\\
&+\frac{1}{3} y^{3(s-1)} \sum_{j=1} \sum_{k=1} \sum_{l=1} ((y+j)\cdot(y+k)\cdot(y+l))^{-s}\\
&-\ldots
\end{aligned}$$

$$
\begin{aligned}
&[1+y^{s-1}\cdot\zeta_n(s,1+y)]^{*k}= \\
&\quad [1+y^{s-1}\cdot\zeta_n(s,1+y)]^{*k-1}+ \\
&\quad y^{s-1}\cdot\sum_{j=1}(j+y)^{-s}[1+y^{s-1}\cdot\zeta_{n\cdot y(j+y)^{-1}}(s,1+y)]^{*k-1}
\end{aligned}
$$

$$[1+y^{s-1}\cdot\zeta_n(s,1+y)]^{*1}=1+y^{s-1}\cdot\sum_{j=1}(j+y)^{-s}$$

$$[1+y^{s-1}\cdot\zeta_n(s,1+y)]^{*2}=1+2\cdot y^{s-1}\cdot\sum_{j=1}(j+y)^{-s}+y^{2(s-1)}\sum_{j=1}\sum_{k=1}((j+y)(k+y))^{-s}$$