WolframAlpha

4∗π ∗ ((2/3∗(N−1))^2∗ ln sqrt(Z^(2/3 ∗ d))) /(4∗π ∗ (sqrt(δ))^(−1

Input:

$$\left\{4\,\pi\times\frac{\left(\frac{2}{3}\,(N-1)\right)^2\log\left(\sqrt{Z^{2/3\,d}}\right)}{\frac{4\,\pi\left(N\times\frac{N-1}{6}\right)}{\sqrt{\delta}}+2\,\pi\times\frac{\frac{Z}{9}}{\delta}},\ d=1,\ Z=3,\ N=4,\ \delta=1\right\}$$

Exact result:

$$\left\{\frac{16\,\pi\,(N-1)^2\log\left(\sqrt{Z^{(2\,d)/3}}\right)}{9\left(\frac{2\,\pi\,(N-1)\,N}{3\sqrt{\delta}}+\frac{2\,\pi\,Z}{9\,\delta}\right)},\ d=1,\ Z=3,\ N=4,\ \delta=1\right\}$$

Substitution:

$$\frac{4\,\delta\,(N-1)^2\log\left(Z^{(2\,d)/3}\right)}{3\sqrt{\delta}\ (N-1)\,N+Z}=\frac{8\log(3)}{13}$$