

$$p_n = 1 + \sum_{i=1}^{2^n} \left\lfloor \left( \frac{n}{\sum_{j=1}^i \left\lfloor \cos^2 \left( \pi \frac{(j-1)!+1}{j} \right) \right\rfloor} \right)^{\frac{1}{n}} \right\rfloor$$