We have to consider approximations of the partial sums of the Prime Zeta Function

$$P(s) = \sum_{p} \frac{1}{p^s}$$

Under RH we should have using the logarithm integral

$$\sum_{p \leq x} \frac{1}{p^{1/2}} = L_i\left(x^{1/2}\right) + O\left(x^{\varepsilon}\right)$$

So that your sequence A292775 should satisfy

$$L_i\left(a_n^{1/2}\right) \sim n$$

Since

$$L_i^{-1}(y) = y\left(\log y + \log\log y - 1 + O\left(\frac{\log\log y}{\log y}\right)\right)$$

we must have

$$A292775(n) \sim n^2\left(\log n + \log\log n - 1\right)^2$$

and nothing really better can be found. A simpler one is

$$A292775(n) \sim p(n)^2$$

where $p(n)$ is the n-th prime.