Name Solution Key



Quiz 5

Thursday, November 5, 2026

You are given that the Schönhage-Strassen algorithm for multiplying two n-digit numbers runs in time $T(n) = O(n \log n \log\log n)$ as $n \to \infty$.

Determine whether each of the following statements is true or false (in each case, as $n \to \infty$).

(a) $T(n) = O(n^2)$ — T (True/False)

(b) $T(n) = \Theta(n^2)$ — F (True/False)

(c) $T(n) = \Omega(n^2)$ — F (True/False)

(d) $T(n) = o(n^2)$ — T (True/False)

(e) $T(n) \sim n^2$ — F (True/False)

(f) $T(n) = O(n \log n)$ — F (True/False)

(g) $T(n) = O(n(\log n)^2)$ — T (True/False)

(h) $(\exists N > 0)(\exists C > 0)(\forall n > N)(T(n) < Cn \log n \log\log n)$ — T (True/False)

(i) $\lim_{n\to\infty} \dfrac{T(n)}{n(\log n)^2} = 0$ — T (True/False)

(j) $\lim_{n\to\infty} \dfrac{T(n)}{n^{1.08}} = 0$ — T (True/False)