Jin-Hui Fang
On almost superperfect numbers,

Abstract

A positive integer n is called an *almost superperfect number* if n satisfies $\sigma(\sigma(n)) = 2n - 1$, where $\sigma(n)$ denotes the sum of positive divisors of n. In this paper, we prove the following results: (1) there does not exist any even almost superperfect number; (2) if n is an almost superperfect number, then n has at least two prime factors; (3) if n is an almost superperfect number, then $\sigma(n)$ is a perfect square; (4) if n is an almost superperfect number and n is a multiple of 3, then n is a perfect square.