Generalizations of some divisibility relations in ℕ

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ABSTRACT.

The present work gives a number of generalizations for some divisibility relations in the set of natural numbers. Let $n \geq 2$ and $x_1, x_2, \ldots, x_n$ be natural numbers. It is well known that $(x_1, x_2)\,[x_1, x_2] = x_1 x_2$, where (x_1, x_2) denotes the greatest common divisor (gcd) and $[x_1, x_2]$ the lowest common multiple (lcm) of the numbers x_1 and x_2. In the present paper we derive the formulas for $(x_1, x_2, \ldots, x_n)$, the gcd of the numbers $x_1, x_2, \ldots, x_n$, in terms of the lowest common multiple (lcm) of the subsets $x_{i_1}, \ldots, x_{i_k}$, with $1 \leq i_1 < \cdots < i_k \leq n$. We also find the dual formula for $[x_1, x_2, \ldots, x_n]$, the lcm of the numbers $x_1, x_2, \ldots, x_n$.

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