

Let $a, b, c, m, n, p \in \mathbb{N}$ and $m < n < p$. Prove or disprove the following:

1. If $a|b^n$ and $a|c^m$, then $a|(bc)^m$
2. $a|b^n$ and $a|c^m$, then $a|(b^p c^n)$