It's false.
Since $3 * 4 = 12$, we can only let m be $1, 2$ and 3.
When $m = 1, 2, 3$, we get $5n = 12 - 3m = 9, 6, 3$.
But $9, 6, 3$ all do not have the factor 5.
Hence, we cannot find the integer n which satisfy any of the circumstances.
Hence, it's proved.