$$(\exists m \in \mathcal{N})(\exists n \in \mathcal{N})(3m + 5n = 12) \tag{1}$$

We will prove that (1) is false by showing that $\forall n \in \mathcal{N}$ there $\nexists m \in \mathcal{N}$ such that $3m + 5n = 12$.

Since $n \in \mathcal{N}$, $n \geq 1$ therefore $5n \geq 5$. This means that $5 \leq 5n = 12 - 3m$. If $m > 2$ then $12 - 3m < 5$ so m must be either 1 or 2.

If $m = 1$,
$5n = 9$. 9 is not divisible by 5 therefore $n \notin \mathcal{N}$ which is a contradiction so $m \neq 1$

If $m = 2$,
$5n = 6$. 6 is not divisible by 5 therefore $n \notin \mathcal{N}$ which is also a contradiction so $m \neq 2$

Thus, $\nexists m \in \mathcal{N}$ such that (1) is true. so (1) must be false.