PROBLEM SET

1. To examine the truth of the statement

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

Consider the equality being proposed

$$3m+5n=12$$

subtracting $3m$ from both sides,

$$5n = 12-3m$$

$$5n = 3(4-m)$$

This implies that $3(4-m)$ is divisible by 5.

So, $4-m$ should be divisible by 5 as 3 & 5 are prime and have no common factors

i.e $(\exists m \in \mathbb{N})(4-m=5p)$

$(\exists p \in \mathbb{N})$

This is clearly not true for any m or p being natural numbers as $4-m$ is always lesser than $5p$

∴ This statement is false..

Note:- $3(4)+5(0)=12$ but zero is not a natural number.