Q.1

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

Proof: Assume $3m+5n=12$ and $\exists n, m \in \mathbb{N}$.

Then, $3m+5n=3*4$.

By rearranging, $5n=3(4-m)$.

Since n is natural, $5n$ is also natural. Thus, $3(4-m)$ is natural.

In order for $3(4-m)$ to be natural, ~~m~~ $m<4$ and $m \in \mathbb{N}$. ~~or~~

By Addition, $5n = 3*4 - 3m$
$+ \quad 4 > m$
$5n+4 > 12-2m$.

By Algebra, $5n+2m > 12+4$.

By ~~Addition~~ Subtraction, $5n+2m > 12+4$
$-(5n+3m=12)$
$-m > 4$

By Addition, ~~4~~ $> m$
$+ \quad -m > 4$
$4-m > 4+m$

→ Subtracting both sides by 4,

$-m > m$.

Divide both sides by m. (m is natural)

$-1 > 1$

Thus, the statement is not True.

QED