1   Problem

Say whether the following is true or false and support your answer by a proof.

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

1.1   Solution

This is false, proof:

By algebra, we re-arrange the equation

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

The minimum value of $n \in \mathcal{N}$ that would gives us an integer m is 3, but this gives us $m = -1$, we can see that any greater value for n would give us a more negative value for m, so we can see that there is not a pair of natural number that fulfill the given conditions. QED.