

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

The statement is false.

Proof: As  $m$  and  $n$  are natural numbers,  $3m > 0$  and  $5n > 0$ .

Rearranging  $3m + 5n = 12$  to  $3m = 12 - 5n$ , we have  $12 - 5n > 0$ .

The only possible values of  $n$  that satisfy the inequality are 1 and 2.

When  $n = 1$ ,  $3m = 7$  and there is no natural number  $m$  satisfies the equation.

Similar for the  $n = 2$  case.

So for all possible values  $m$  can take, there is no  $n$  satisfies the equation, proving the statement is false.