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

Proof: There are three cases:

        Case 1: Suppose n = 1. Then: $3 \cdot 1 + 5m = 12$
        Simplify: $5m = 12 - 3 = 9$
        9 is not a multiple of 5 in the Natural numbers, so this cannot be correct.

        Case 2: Suppose m = 1. Then: $3n + 5 \cdot 1 = 12$
        Simplify: $3n = 12 - 5 = 7$
        7 is not a multiple of 5 within the Natural numbers, so this also cannot be correct.

        Case 3: Suppose n = 2 and m = 2. Then: $3 \cdot 2 + 5 \cdot 2 = 12$
        Simplify: $6 + 10 = 16 = 12$
        Which is also not correct, and more so, 16 > 12, therefore for any m or n greater than 2, the result would be greater than 12. Therefore this theorem is false.