Max Gebski - Answers to Test Flight Problem Set

Question 1

Say whether the following is true or false and support your answer by a proof.
$(\exists m \in N)(\exists n \in N)(3m + 5n = 12)$

The statement is false. When *n* is larger or equal to 2 we have: $3m + 5n \geq 13$ for any m. This is because when n = 2 we have $3m + 10$, which means the sum is at least 13 since *m* is part of the natural numbers. Thus *n* must be equal to 1. From this we get: $3m + 5$. This means $3m$ needs to be equal to $12 - 5 = 7$ in order for the equality to hold. Since $\neg(3 \mid 7)$ there is no natural number *m* for which the statement is true.