

13a) Suppose that a statement of the form $\forall x P(x)$ is false. How can this be proved?

WOULD I SAY SOMETHING LIKE THIS?

Let $P(x)$ be the statement $x + 1 < x$ where the domain consists of natural numbers.

FOR ALL NATURAL NUMBERS 0, 1, 2, 3... there exists no natural number x that when one is added to it, is less than x .

DO I NEED TO CREATE A CASE LIKE THE ABOVE? OR IS THIS NOT REQUIRED? IS THE MORE GENERAL ANSWER OF "TO PROVE $\forall x P(x)$ IS FALSE WE JUST NEED TO FIND THAT THERE EXISTS ONE x THAT IS FALSE" PREFERRED?

13b) Show that the statement "For every positive integer n , $n^2 \geq 2n$ is false.

WOULD I USE SOMETHING LIKE THIS?

I will use a constructive proof to show there exists at least one positive integer that when squared is not greater than or equal to 2 times n .

If we use 1 for n we get:

$1^2 = 1 \geq 2(1) = 2$. Since 1 is not greater than or equal to two we have proven that $n^2 \geq 2n$ is false.