Some Notes on Proof Writing in MAT 243

All proofs you are expected to write in this class are informal, i.e. English-language essays that lead a reader from the assumptions, which must be clearly stated, to the conclusions, without unnecessary elements. A good proof is concise.

Sentences must be grammatically correct and have proper sentence structure. It is acceptable, even desirable, to use some mathematical symbols in there, but the English words plus the logical symbols must form a grammatically correct sentence.

Here is a counter-example:

"Since n is an even number -> n = 2k+1 for some k."

The conditional symbol -> can be read in various ways, but none of them make the above into a proper sentence:

"If since n is an even number then n = 2k+1 for some k."
"Since n is an even number implies n = 2k+1 for some k."

You could fix this by eliminating the word "since".

Grammatical correctness requires that sentences have proper punctuation, even when they end with an equation.

Good:
Since x=2, 2x=4.

Bad:
Since x=2
2x=4

Using the quantifiers symbolically in your proof writing is not wrong but looks awkward and does not improve readability. I would recommend you do not do this.

A major faux pas in proof writing is to pad your proofs with unnecessary statements, or to make your sentences unnecessarily verbose by spelling out the meaning of standard relational operators or sets in English.

Good:
Since $n \in \mathbb{N}$ ..

Bad:
Since n is an element of the set of natural numbers..

Good:
$x=1$ implies $2x=2$.

Bad:
Since we know the equation $x=1$ to be true, it can be seen that $2x=2$ must be true as well.

Good:
$a<b$ implies $a+1<b+1$.

Bad:
Since the number a is less than the number b, we conclude logically that the number a plus one is less than the number b plus one.

It's not writing as many words as possible that will earn you a good grade on the proof papers, it is logical correctness and conciseness.