Warning

Henceforth, when asked to *symbolically write* a statement, unless otherwise stated,

- symbolically write the statement as it is stated (rather than something equivalent)
- if a statement is a quantified open sentence, then use needed quantifier(s) before the open sentence (e.g.: $\forall$, $\exists$, $\exists!$)
- use logical connectives symbols (e.g.: $\sim$, $\wedge$, $\vee$, $\implies$, $\iff$) instead of the English words
- within an open sentence, you can use English words that are not logical connectives (e.g.: x is even). Beware: "x and y are odd" should be expressed as "x is odd $\wedge$ y is odd".
- within an open sentence, you can use math symbols that are not logical connectives (e.g.: $a|b$, $a \equiv b \pmod{n}$)

Exercise. A variant of Exercise 3.1.16c. §3.1 p99

Conjecture 1. For nonnegative real numbers x and y

$$\sqrt{xy} \leq \frac{x+y}{2}.$$

a. Symbolically write Conjecture 1.

As the universe, use: $\mathbb{R}$, $\mathbb{R}^{>0}$, $\mathbb{R}^{\geq 0}$, and/or some cross product of these. See above Warning.

cut this out and put your solution here

b. Determine if Conjecture 1 is true or false. If Conjecture 1 is true, then write a formal proof of Conjecture 1. If Conjecture 1 is false, then provide a counterexample that shows (and clearly explains) why Conjecture 1 if false. (Hint: class example Exercise 3.1.19b might be helpful).

cut this out and put your solution here