CSC240 Winter 2024 Quiz 2
due 2:00pm on Friday January 19

A 3-CNF formula is a formula in CNF in which every clause contains at most 3 literals.

Consider the propositional formula $E =$ "$(((P \text{ OR } Q) \text{ OR } R) \text{ OR } \text{NOT}(S))$".

Explain why there is no 3-CNF formula containing only the variables P, Q, R, and S that is logically equivalent to E.

To convert E into 3-CNF, we need to distribute the OR operations over the AND oprations, but becasue E has no AND operations, we cannot do this. So, since changing E to a CNF formula will either change the logical value, or has a clause containing more than 3 literals, therefore we conclude that there is no 3-CNF formula containing only the variables P, Q, R, and S that is logically equivalent to E, as needed.