Axiomatic Semantics and Hoare-style Verification

Axiomatic semantics (or Hoare-style logic) defines the meaning of a statement in terms of its effects on assertions of truth that can be made about the associated program. A *Hoare Triple* encodes these assertions in the form $\{P\}S\{Q\}$ where P is the precondition, Q is the postcondition, and S is a piece of code of interest. Using derivation rules for Hoare triples, we can prove that these triples hold.

1. Prove $\{\texttt{x} > 1\}$ `x:=x+1; x:=-x` $\{\texttt{x} < 0\}$.

2. Prove that the program `x:=x+y; y:=x-y; x:=x-y` swaps the values of `x` and `y`. The conclusion should be:
   $\{\texttt{x} = A \wedge \texttt{y} = B\}$ `x:=x+y; y:=x-y; x:=x-y` $\{\texttt{y} = A \wedge \texttt{x} = B\}$