4.4 Let the variables be $x, y: \text{int}$. Write a program to refine specification $\neg ok$. Prove your refinement.

\[
\neg ok \iff x := x+1
\]

Proof:

\[
\neg ok \quad \text{expand } \neg ok
\]
\[
\equiv \neg (x' = x \land y' = y) \quad \text{duality, inequality}
\]
\[
\equiv x' \neq x \lor y' \neq y \quad \text{generalization}
\]
\[
\iff x' + x \quad \text{direction, translation, exclusivity}
\]
\[
\iff x' = x + 1 \quad \text{specialization}
\]
\[
\iff x' = x + 1 \land y' = y \quad \text{definition of assignment}
\]
\[
\equiv x := x + 1
\]