Let $x$ and $y$ be binary variables. Simplify
(a) $x := x = y$. $x := x = y$
(b) $x := x \lor y$. $y := x \lor y$. $x := x \lor y$

After trying the question, scroll down to the solution.
§(a)  
\[ x := x = y \]  
\[ \Rightarrow x := x = y \]  
\[ x' = (x = y) \land y' = y \]  
\[ \Rightarrow x' = (x = y) \land y' = y \]  
\[ x' = (x = (y = y)) \land y' = y \]  
\[ \Rightarrow x' = x \land y' = y \]  
\[ \Rightarrow \text{ok} \]

§(b)  
\[ x := x + y \]  
\[ y := x + y \]  
\[ x := x + y \]  
\[ \Rightarrow x := x + y \]  
\[ y := x + y \]  
\[ x' = (x + y) \land y' = (x + y) \]  
\[ \Rightarrow x' = (x + y) \land y' = (x + y) \]  
\[ x' = ((x + y) + (x + y)) \land y' = ((x + y) + y) \]  
\[ \Rightarrow x' = ((x + y) + (y + y)) \land y' = (x + y) \]  
\[ x' = ((x + y) + (y + y)) \land y' = (x + y) \]  
\[ \Rightarrow x' = y \land y' = x \]