

## 7.7.x. Exercise questions

Use derivations to check each of the claims below; if a derivation indicates that a claim fails, describe a structure that divides an open gap.

1.  $Fa \Rightarrow \forall x Fx$
2.  $\forall x Rxx \Rightarrow \forall x Rxa$
3.  $\forall x \neg Fx \Leftrightarrow \neg \forall x Fx$
4. *No widget is a gadget*  
*No gizmo is a widget*  
*No gizmo is a gadget*
5. *No widget is a gadget*  $\Leftrightarrow$  *Not every widget is a gadget*
6. *Everything is either finished or unstated*  
*Either everything is finished or everything is unstated*
7.  $\neg \forall x \neg \forall y Rxy \Rightarrow \forall x \neg \forall y \neg Rxy$