7.5.x. Exercise questions

1. Give the instances of each of the following for the terms a, b, and c (remembering that you will drop the main quantifier, and only the main one, when giving an instance):
   a. ∀x Fx
   b. ∀y Fy
   c. ∀x Rxa
   d. ∀x Saxb
   e. ∀x ∀y Rxy
   f. ∀x (Fx → Gx)
   g. ∀x (Fx → Gd)
   h. ∀x (Fx → ∀y Rxy)
   i. ∀x (Fx → ∀x Rxx)

2. Use the system of derivations to establish each of the following. You may use detachment and attachment rules.
   a. ∀x Fx, ∀x (Fx → Gx) ⇒ Ga
   b. ∀x (Fx ∧ Gx) ⇒ Fa ∧ Gb
   c. ∀x Rxa, ∀x (Rbx → Gx) ⇒ Ga
   d. ∀x Fx, ∀x (Fx → Gx) ⇒ ∀x Gx
   e. ∀x (Fx ∧ Gx) ⇔ ∀x Fx ∧ ∀x Gx
   f. ∀x ∀y Rxy ⇒ (Rab ∧ Rbb) ∧ Rca
   g. ∀x ∀y Rxy ⇒ ∀y Rya
   h. ∀x ∀y (Rxy → ¬ Ryx) ⇒ ∀x ¬ Rxx
   i. ∀x ∀y ∀z ((Rxy ∧ Ryz) → Rxz), ∀x ¬ Rxx ⇒ ∀x ∀y (Rxy → ¬ Ryx)