Homework: Predicate Logic plus identity

Part A: establishing validity.

Show that:

1. $\models \forall x Fx \rightarrow \forall y Fy$
2. $\models \forall x(Fx \rightarrow (Fx \lor Gx))$
3. $\{\forall x(Fx \rightarrow Gx), \forall x(Gx \rightarrow Hx)\} \models \forall x(Fx \rightarrow Hx)$
4. $\{Fab\} \models \forall x(x=a \rightarrow Fxb)$

Part B: establishing invalidity

Show that

5. $\nvDash \forall x(Fx \lor \sim Gx)$
6. $\nvDash \forall x(Fx \rightarrow Gx) \rightarrow \forall x(Gx \rightarrow Fx)$
7. $\{Rab\} \nvDash \exists x Rxx$
8. $\{\exists x \exists y \exists z(Fx \& Fy \& Fz \ \& \ x \neq y \ \& \ x \neq z \ \& \ y \neq z), \forall x(Fx \rightarrow (Gx \lor Hx))\} \nvDash \exists x \exists y \exists z(Gx \& Gy \& Gz \ \& \ x \neq y \ \& \ x \neq z \ \& \ y \neq z)$