Philosophy 211 -- Assignment #7

I. Prove these sequents.

1. $\forall x(Px \rightarrow Qx), \forall x(Sx \rightarrow \sim Qx) \vdash \forall x(Px \rightarrow \sim Sx)$
2. $\forall x(Px \rightarrow Sx) \text{ v } \forall x(Px \rightarrow Qx) \vdash \forall x(Px \rightarrow(Sx \text{ v } Qx))$
3. $\sim\forall x\sim(Px \text{ \& } Qx) \vdash \sim\forall x\sim Px \text{ \& } \sim\forall x\sim Qx$
4. $\forall x\forall y(Rxy \text{ v } Ryx) \vdash \forall xRxx$
5. $\forall x\forall y(Rxy \rightarrow \sim Ryx) \vdash \forall x\sim Rxx$
6. $\forall x\forall y(Rxy \rightarrow Syx), \forall x\forall y(Rxy \text{ v } Ryx) \vdash \forall x\forall y(Sxy \text{ v } Syx)$
7. $\forall x\forall yRxy, \forall x\forall y(Rxy \rightarrow Syx) \vdash \forall x\forall ySxy$
8. $\forall x\forall y(Rxy \rightarrow Px) \vdash \forall x(\forall yRxy \rightarrow Px)$
9. $\forall x\forall y\forall z((Rxy \text{ \& } Rxz) \rightarrow Ryz), \forall xRxx \vdash \forall x\forall y(Rxy \rightarrow Ryx)$
10. $\forall x\forall y\forall z((Rxy \text{ \& } Ryz) \rightarrow Rxz) \vdash \forall x\forall y\forall z\forall w(((Rxy \text{ \& } Ryz) \text{ \& } Rzw) \rightarrow Rxw)$

II. Paraphrase these sentences into Predicate Logic. Use the following names and predicates: Aα: α is on Team A; Bα: α is on Team B; D$\alpha\beta$: α defeated β; m: Mary; g: George.

1. Everyone on Team A who defeated George defeated Mary.
2. Everyone on Team A who was defeated by George was defeated by Mary.
3. No one on team defeated both Tom and Mary.
4. No one on Team A was defeated by everyone on Team B.
5. There was someone on Team A who was defeated by everyone on Team B.
6. If everyone on Team A defeated George, then someone on Team B defeated George.
7. If anyone on Team A defeated George, then everyone on Team B defeated George.
8. Everyone on Team A who defeated someone on Team B was defeated by Mary.
9. At least two members of Team A were defeated by Mary.
10. Everyone on Team A defeated at least two members of Team B.