

1.  $\neg\exists xFx \rightarrow \forall x\neg Fx$  (without qn)

2.  $\exists y\forall x(Fx \leftrightarrow Fy) \cdot \exists xFx \therefore \forall xFx$

3.  $\exists y\forall x(Fx \wedge Gy) \therefore \forall x\exists y(Fx \wedge Gy)$

1. Show  $\neg\exists xFx \rightarrow \forall x\neg Fx$
2.  $\neg\exists xFx$                       ass cd
3. Show  $\forall x\neg Fx$
4. Show  $\neg Fx$
5.  $Fx$                               ass id
6.  $\exists xFx$                           5, eg
7.  $\neg\exists xFx$                       2, r
8. ...
9. ...
10. ...

pr1	$\exists y \forall x (F_x \leftrightarrow F_y)$	<u>pr</u>
pr2	$\exists x F_x$	<u>pr</u>
1	<b>Show</b> $\forall x F_x$	
2	$\neg \forall x F_x$	<u>ass id</u>
3	$\exists x \neg F_x$	2, <u>gn</u>
4	$F_z$	pr2, <u>ei</u> , z
5	$\forall x (F_x \leftrightarrow F_u)$	pr1, <u>ei</u> , u
6	$F_z \leftrightarrow F_u$	5, <u>ui</u> , z
7	$F_z \rightarrow F_u$	6, <u>bc</u>
8	$F_u$	4, 7, <u>mp</u>
9	$\neg F_w$	3, <u>ei</u> , w
10	$F_w \leftrightarrow F_u$	5, <u>ui</u> , w
11	$F_u \rightarrow F_w$	10, <u>bc</u>
12	$\neg F_u$	9, 11, <u>mt</u>
13		8, 12, <u>id</u>

pr1	$\exists y \forall x (Fx \wedge Gy)$	pr
1	<b>Show</b> $\forall x \exists y (Fx \wedge Gy)$	
2	$\neg \forall x \exists y (Fx \wedge Gy)$	<u>ass id</u>
3	$\exists x \neg \exists y (Fx \wedge Gy)$	2, <u>qn</u>
4	$\neg \exists y (Fz \wedge Gy)$	3, <u>ej</u> , z
5	$\forall x (Fx \wedge Gu)$	pr1, <u>ej</u> , u
6	$Fz \wedge Gu$	5, <u>uj</u> , z
7	$\forall y \neg (Fz \wedge Gy)$	4, <u>qn</u>
8	$\neg (Fz \wedge Gu)$	7, <u>uj</u> , u
9	$\neg Fz \vee \neg Gu$	8, <u>dm</u>
10	$Fz$	6, <u>s</u>
11	$\neg \neg Fz$	10, <u>dn</u>
12	$\neg Gu$	11, 9, <u>mtp</u>
13	$Gu$	6, <u>s</u>
14		12, 13, <u>id</u>

pr1	$\exists y \forall x (F_x \wedge G_y)$	pr
1	<b>Show</b> $\forall x \exists y (F_x \wedge G_y)$	
2	$\neg \forall x \exists y (F_x \wedge G_y)$	ass id
3	$\exists x \neg \exists y (F_x \wedge G_y)$	2, gn
4	$\neg \exists y (F_z \wedge G_y)$	3, ei, z
5	$\forall x (F_x \wedge G_u)$	pr1, ei, u
6	$F_z \wedge G_u$	5, ui, z
7	$\exists y (F_z \wedge G_y)$	6, eg, u, y
8		4, 7, id