1) $\therefore \forall xF\,x \lor \neg\forall xF\,x$

○ TFL ◉ FOL

Premises (separate with "," or ";"):

Conclusion:

∀xF x ∨ ¬∀xF x

CREATE PROBLEM

Proof:

Construct a proof for the argument: $\therefore \forall xFx \lor \neg\forall xFx$

1	$\forall xFx$ (assumption)	
2	$\neg\forall xFx$ (assumption)	
3	$\bot$	⊥I 1 2
4	$\forall xFx$	IP 2–3
5	$\forall xFx \lor \neg\forall xFx$	∨I 4
6	$\neg\forall xFx$ (assumption)	
7	$\forall xFx$ (assumption)	
8	$\bot$	¬E 6 7
9	$\neg\forall xFx$	¬I 7–8
10	$\forall xFx \lor \neg\forall xFx$	∨I 9
11	$\forall xFx \lor \neg\forall xFx$	LEM 1–5, 6–10

NEW LINE | NEW SUBPROOF

☺ Congratulations! This proof is correct.

CHECK PROOF | START OVER

2) $\forall x(Fx \Longrightarrow Gx)$, $\exists xFx \therefore \exists xGx$

TFL FOL

Premises (separate with "," or ";"):

∀x(F x ⇒ Gx),∃xF x

Conclusion:

∃xGx

CREATE PROBLEM

Proof:

Construct a proof for the argument: $\forall x(Fx \rightarrow Gx)$, $\exists xFx \therefore \exists xGx$

1	$\forall x(Fx \rightarrow Gx)$	
2	$\exists xFx$	
3	$\quad Fc$	
4	$\quad Fc \rightarrow Gc$	∀E 1
5	$\quad Gc$	→E 3 4
6	$\quad \exists xGx$	∃I 5
7	$\exists xGx$	∃E 2, 3–6

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.

CHECK PROOF START OVER

Sample exercise sets

- Sample Truth-Functional Logic exercises (Chap. 15, ex. C; Chap. 17, ex. B)

3) $\forall x(\neg Mx \lor Ljx)$, $\forall x(Bx \implies Ljx)$, $\forall x(Mx \lor Bx) \therefore \forall x Ljx$

1	$\forall x(\neg Mx \lor Ljx)$	
2	$\forall x(Bx \to Ljx)$	
3	$\forall x(Mx \lor Bx)$	
4	$\neg Ma \lor Lja$	∀E 1
5	$Ba \to Lja$	∀E 2
6	$Ma \lor Ba$	∀E 3
7	Ba	
8	Lja	→E 5, 7
9	Ma	
10	$\neg Ma$	
11	$\bot$	¬E 9, 10
12	Lja	X 11
13	Lja	
14	Lja	∨E 4, 10–12 13–13
15	Lja	∨E 6 7–8 9–14
16	$\forall x Ljx$	∀I 15

NEW LINE

NEW SUBPROOF

☺ Congratulations! This proof is correct.

CHECK PROOF

START OVER

Sample exercise sets

4) P a ∨ Qb, Qb =⇒ (b = c), ¬P a ∴ Qc

Premises (separate with "," or ";"):

P a ∨ Qb, Qb ⇒ (b = c), ¬P a

Conclusion:

Qc

CREATE PROBLEM

Proof:

Construct a proof for the argument: $Pa \vee Qb,\ Qb \rightarrow b = c,\ \neg Pa \therefore Qc$

1	$Pa \vee Qb$	
2	$Qb \rightarrow b = c$	
3	$\neg Pa$	
4	$\quad Pa$	
5	$\quad \bot$	¬E 3, 4
6	$\quad Qb$	X 5
7	$\quad Qb$	
8	Qb	∨E 1, 4–6 7–7
9	$b = c$	→E 2 8
10	Qc	=E 8 9

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.

CHECK PROOF START OVER

Sample exercise sets

5) ∀x∀y(Rxy ==⇒ (x = y)) ∴ Rab ==⇒ Rba

Premises (separate with "," or ";"):

∀x∀y(Rxy ⇒ (x = y))

Conclusion:

Rab ⇒ Rba

CREATE PROBLEM

Proof:

Construct a proof for the argument: $\forall x \forall y(Rxy \rightarrow x = y) \therefore Rab \rightarrow Rba$

1	$\forall x \forall y(Rxy \rightarrow x = y)$	
2	$\forall y(Ray \rightarrow a = y)$	∀E 1
3	$Rab \rightarrow a = b$	∀E 2
4	Rab	
5	$a = b$	→E 3 4
6	Rbb	=E 4 5
7	Rba	=E 5 6
8	$Rab \rightarrow Rba$	→I 4–7

NEW LINE   NEW SUBPROOF

☺ Congratulations! This proof is correct.

CHECK PROOF   START OVER

Sample exercise sets

- Sample Truth-Functional Logic exercises (Chap. 15, ex. C; Chap. 17, ex. B)