

Additional Homework 9 Questions

For each of the following arguments, show that the argument is invalid by constructing a model in which the argument has true premises and a false conclusion. Prove this using the method of expansion.

1. $\exists xFx / \forall xFx$
2. $\forall x(Fx \rightarrow (Gx \vee Hx)) / \forall x(Fx \rightarrow Gx) \vee \forall x(Fx \rightarrow Hx)$
3. $\forall x(Fx \rightarrow Gx) ; \sim Ga / \sim \exists xFx$
4. $\exists x\exists yLxy / \exists x\forall yLxy$
5. $\exists x(Fx \& \forall y(Gy \rightarrow Lxy)) / \forall x(Fx \rightarrow \exists y(Gy \& Lxy))$

Answers1. $\exists xFx / \forall xFx$

U = {0,1} (F0 \vee F1) / (F0 & F1)
 F: {0} T T F T F F

2. $\forall x(Fx \rightarrow (Gx \vee Hx)) / \forall x(Fx \rightarrow Gx) \vee \forall x(Fx \rightarrow Hx)$

U = {0,1} (F0 \rightarrow (G0 \vee H0)) & (F1 \rightarrow (G1 \vee H1)) /
 F: {0,1} T T T T F T T T F T T
 G: {0} ((F0 \rightarrow G0) & (F1 \rightarrow G1)) \vee ((F0 \rightarrow H0) & (F1 \rightarrow H1))
 H: {1} T T T F T F F F T F F F T T T

3. $\forall x(Fx \rightarrow Gx) ; \sim Ga / \sim \exists xFx$

U = {0,1} (F0 \rightarrow G0) & (F1 \rightarrow G1) ; $\sim G0$ /
 F: {1} F T F T T T T T F
 G: {1} $\sim(F0 \vee F1)$
 a: 0 F F T T

4. $\exists x\exists yLxy / \exists x\forall yLxy$

U = {0,1} (L00 \vee L01) \vee (L10 \vee L11) /
 L: {<0,0>} T T F T F F F
 (L00 & L01) \vee (L10 & L11)
 T F F F F F F

5. $\exists x(Fx \ \& \ \forall y(Gy \rightarrow Lxy)) / \forall x(Fx \rightarrow \exists y(Gy \ \& \ Lxy))$

U = {0}

F0 & (G0 \rightarrow L00) / F0 \rightarrow (G0 & L00)

F: {0}

T T F T F T F F F F

G: {}

L: {}