

Instruction: Complete the following tasks using models.

1 Show that each of the following is contingent:

1.1 $\exists x(Fx \wedge Gx) \rightarrow \exists x\neg(Fx \vee Gx)$

1.2 $\forall z(Fz \rightarrow \neg Fz)$

2 Show that the following pairs of sentences are not logically equivalent.

2.1 $\exists xFx \rightarrow Ga, \exists x(Fx \rightarrow Ga)$

2.2 $\forall x(Fx \rightarrow Gx), \forall y(\forall Fx \rightarrow Gy)$

3 Show that the following sets of sentences are consistent

3.1 $\forall x(Dax \leftrightarrow Bax), \neg Dab, \neg Bba$

3.2 $\forall x(Bx \leftrightarrow \forall yCxy), \exists xBx, \exists x\exists yCxy$

4 Prove the following:

4.1 $\forall x(Fx \rightarrow Gx), \neg\exists xFx \not\models \neg\exists xGx$

4.2 $\forall x\forall y(Mxy \rightarrow Nxy) \not\models \forall x\forall y(Mxy \rightarrow (Nxy \wedge Nyx))$