

Instruction: Complete the following using models.

1 Show that each of the following is contingent:

1.1 $\exists x(Gx \rightarrow \forall yMy)$

1.2 $\forall zJz \leftrightarrow \exists yJy$

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

2.1 $\forall x\exists yRxy, \exists x\forall yRxy$

2.2 $\forall x\exists yRxy, \forall x\exists yRyx$

3 Show that the following sets of sentences are consistent

3.1 $\forall x(Px \vee Qx), \exists x\neg(Qx \wedge Px)$

3.2 $\exists z(Nz \wedge Ozz), \forall x\forall y(Oxy \rightarrow Oyx)$

3.3 $\neg\exists x\forall yRxy, \forall x\exists yRxy$

4 Show that the following argument is invalid.

4.1 $\forall xOxc, \forall xOcx \models \forall xOxx$