5.8.1. Quantifier Semantics Problems: Simple Instances

A. For each of the numbered sentences below, state which are instances of the following universal sentence.

$$\forall x\,((Gx \wedge Hx) \rightarrow \sim Jx)$$

1. $((Ga \wedge Ha) \rightarrow \sim Jx)$
2. $((Ga \wedge Ha) \rightarrow \sim Ja)$
3. $\forall x\,((Ga \wedge Ha) \rightarrow \sim Ja)$
4. $((Gb \wedge Hb) \rightarrow \sim Jb)$
5. $((Ga \wedge Hb) \rightarrow \sim Jb)$
6. $((Gc \wedge Hc) \rightarrow \sim Jc)$

B. Based on your answer to **(A)**, state whether the universal sentence "$\forall x\,((Gx \wedge Hx) \rightarrow \sim Jx)$"is true or false in the following model.

G: __is a cat **J**: __ can be in the new calendar
H:__ is fat

$\mathbb{D}$: {**Neko**, **Rex**}

a: **Neko**
b: **Rex**

G: {**Neko**}
H: {**Neko, Rex**}
J: { }

C. According to our definition of "instance," is "Ga" an instance of "$\exists x\,Ga$"?

D. For each of the quantified sentences below, state whether it is true or false in the model given here.

$\mathbb{D}$: {**2**, **3**, **4**}

a: **2**
b: **3**
c: **4**

G: {**4**}
H: {**3**, **4**}
I: {**2**, **3**, **4**}
J: { }

(1) $\exists x\, Hx$
(2) $\forall x\, Hx$
(3) $\exists x\, Jx$
(4) $\exists x\, (Hx \wedge Gx)$
(5) $\exists x\, (Hx \vee Jx)$
(6) $\exists x\, (Hx \wedge \sim Hx)$
(7) $\exists x\, (Hx \vee \sim Hx)$
(8) $\forall x\, (Hx \vee \sim Hx)$
(9) $\forall x\, (Jx \vee \sim Jx)$
(10) $(Ga \rightarrow \exists x\, Gx)$
(11) $(Gb \rightarrow \exists x\, Gx)$
(12) $\forall x\, (Ix \rightarrow Hx)$
(13) $\forall x\, (Hx \rightarrow Ix)$
(14) $\exists x\, (Gx \rightarrow Jx)$
(15) $\exists x\, (Jx \rightarrow Gx)$
(16) $\exists x\, (Jx \leftrightarrow Gx)$
(17) $\forall x\, (Jx \leftrightarrow Gx)$
(18) $\forall x\, (Jx \rightarrow Gx)$
(19) $\forall x\, (Jx \rightarrow \sim Gx)$
(20) $\exists x\, ((Hx \vee Jx) \leftrightarrow Gx)$
(21) $\forall x\, ((Hx \vee Jx) \leftrightarrow Gx)$
(22) $\forall x\, ((Hx \vee Ix) \leftrightarrow \sim Jx)$
(23) $\forall x\, ((Hx \vee Ix) \leftrightarrow Ix)$
(24) $\forall x\, ((Hx \wedge Ix) \leftrightarrow Ix)$
(25) $\exists x\, ((Hx \wedge Ix) \wedge \sim Gx)$
(26) $\forall x\, ((Hx \vee \sim Hx) \leftrightarrow \sim Jx)$
(27) $\forall x\, ((Hx \vee \sim Hx) \leftrightarrow Ix)$
(28) $\forall x\, ((Hx \vee \sim Hx) \leftrightarrow Gx)$