5.5.1. Quantifier Semantics Problems

A. For each of the **English sentences** (in the left list) **write** (in its accompanying blank) the number of its corresponding **formal sentence** (from the right list).

English Sentences:	**Formal Sentences**:
a. Something is physical, but something isn't. **Matching Form**:_____	1. $(\exists x\, Gx \wedge \forall x\, \sim Gx)$
b. Something is physical, but not everything is. **Matching Form**:_____	2. $\exists x(Gx \wedge \sim Gx)$
c. Something is both physical and non-physical. **Matching Form**:_____	3. $(\exists x\, Gx \wedge \exists x\, \sim Gx)$
d. Though something is physical, everything is non-physical. **Matching Form**:_____	4. $(\exists x\, Gx \wedge \sim \forall x\, Gx)$

B. **Translate** each of the following English sentences into the formal language, and then decide if that sentence is **true or false** in the model given below.

Translation Table:

A: Mount Everest
B: The Cathedral of Learning
G: __ is impressive
H: __ is made of limestone

Sentences:

1. If Mount Everest isn't impressive, then nothing is.

2. Not everything is made of limestone, but the Cathedral of Learning is.

3. Something is impressive if and only if not everything is unimpressive.

Model:

D: {**Mount Everest**, **The Cathedral of Learning**}

A: **Mount Everest**
B: **The Cathedral of Learning**

G: {**The Cathedral of Learning**}
H: {**The Cathedral of Learning**}

C. **Translate** each of the following English arguments into the formal language, and then decide if the model given below is a **validity counterexample** for that argument.

Translation Table:

A: Neko
B: Rex

G: __ is made of matter
H: __ is a building
I: __ is a cat

Arguments:

(1) 1. Neko isn't a building made of matter.

∴ Not everything is made of matter.

(2) 1. If Rex is a cat then something is a cat, and if Neko is a cat then something is a cat.

∴ If either Rex or Neko is a cat, then something is a cat.

Model:

D: {**Neko**, **Rex**}

A: **Neko**
B: **Rex**

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

D. Explain why the universal sentence "∀x Gx" will entail each of its instances – that is, why each of the following arguments will be valid.

∀x Gx	∀x Gx	∀x Gx	(etc.)
∴ GA	∴ GB	∴ GC	

(*If one of these arguments were invalid, what would the* validity counterexample *for that argument be like?*)