8.1.xa. Exercise answers

1. **a.** *Someone is missing*
(∃x: x *is a person*) x *is missing*

(∃x: Px) Mx
∃x (Px ∧ Mx)

[M: λx (x *is missing*); P: λx (x *is a person*)]

b. *No one found the loot*.
¬ *someone found the loot*
¬ *someone is such that (he or she found the loot)*
¬ (∃x: x *is a person*) x *found the loot*

¬ (∃x: Px) Fxl
¬ ∃x (Px ∧ Fxl)

[F: λxy (x *found* y); P: λx (x *is a person*); l: *the loot*]

c. *There is a tavern in the town*
Something is a tavern in the town
Something is such that (it is a tavern in the town)
∃x x *is a tavern in the town*
∃x (x *is a tavern* ∧ x *is in the town*)

∃x (Tx ∧ Ixt)

[I: λxy (x *is in* y); T: λx (x *is a tavern*); t: *the town*]

It would also be possible to understand *in the town* to modify the verb *is* rather the noun *tavern*. In that case, the sentence could be restated as *A tavern is in the town* and be analyzed using a restricted existential.

d. *Some winner of the lottery has not come forward*
Some winner of the lottery is such that (he or she has not come forward)
(∃x: x *is a winner of the lottery*) x *has not come forward*
(∃x: x *is a winner of the lottery*) ¬ x *has come forward*

(∃x: Wxl) ¬ Fx
∃x (Wxl ∧ ¬ Fx)

[F: λx (x *has come forward*); W: λxy (x *is a winner of* y); l: *the lottery*]

e. *Tod watched a dance troop from India*
A dance troop from India is such that (Tod watched it)

(∃x: x *is a dance troop from India*) *Tod watched* x
(∃x: x *is a dance troop* ∧ x *is from India*) Wtx

(∃x: Dx ∧ Fxi) Wtx
∃x ((Dx ∧ Fxi) ∧ Wtx)

[D: λx (x *is a dance troop*); F: λxy (x *is from* y); W: λxy (x *watched* y); i: *India*; t: *Tod*]

f. *The search turned up no car fitting the description*
¬ *the search turned up a car fitting the description*
¬ *a car fitting the description is such that (the search turned it up)*
¬ (∃x: x *is a car fitting the description*) *the search turned up* x
¬ (∃x: x *is a car* ∧ x *fit the description*) Tsx

¬ (∃x: Cx ∧ Fxd) Tsx
¬ ∃x ((Cx ∧ Fxd) ∧ Tsx)

[C: λx (x *is a car*); F: λxy (x *fit* y); T: λxy (x *turned up* y); d: *the description*; s: *the search*]

g. *There is a button behind you that will open the door*
Something is a button behind you that will open the door
Something is such that (it is a button behind you that will open the door)
∃x x *is a button behind you that will open the door*
∃x (x *is a button behind you* ∧ x *will open the door*)
∃x ((x *is a button* ∧ x *is behind you*) ∧ Oxd)

∃x ((Bx ∧ Hxo) ∧ Oxd)

[B: λx (x *is a button*); H: λxy (x *is behind* y); O: λxy (x *will open* y); d: *the door*; o: *you*]

If the prepositional phrase *behind you* is understood to modify *is* instead of *button*, the sentence could be restated as *A button that will open the door is behind you*. This sentence would be analyzed by the restricted existential (∃x: Bx ∧ Oxd) Hxo, in which two of the conjuncts from the quantified predicate in the analysis above appear instead in the restriction of the quantifier.

h. *If Tom doesn't find anything, he'll be disappointed*
Tom won't find anything → *Tom will be disappointed*
¬ *Tom will find something* → *Tom* will be disappointed
¬ *something is such that (Tom will find it)* → Dt
¬ ∃x *Tom will find* x → Dt

¬ ∃x Ftx → Dt

[D: λx (x *will be disappointed*); F: λxy (x *will find* y); t: *Tom*]

i. *Al went to a restaurant no one he knew had heard of*
A restaurant no one Al knew had heard of is such that (Al went to it)
(∃x: x *is a restaurant no one Al knew had heard of*) *Al went to* x
(∃x: x *is a restaurant* ∧ *no one Al knew had heard of* x) Wax
(∃x: Rx ∧ ¬ *someone Al knew had heard of* x) Wax
(∃x: Rx ∧ ¬ *someone Al knew is such that (he or she had heard of* x*)*) Wax
(∃x: Rx ∧ ¬ (∃y: y *is a person Al knew*) y *had heard of* x) Wax
(∃x: Rx ∧ ¬ (∃y: y *is a person* ∧ *Al knew* y) Hyx) Wax

(∃x: Rx ∧ ¬ (∃y: Py ∧ Kay) Hyx) Wax
∃x ((Rx ∧ ¬ ∃y ((Py ∧ Kay) ∧ Hyx)) ∧ Wax)

H: λxy (x *had heard of* y); K: λxy (x *knew* y); P: λx (x *is a person*); R: λx (x is a restaurant); W: λxy (x *went to* y); a: *Al*]

2. a. ∃x x *is burning*
something is such that (it is burning)

Something is burning
or: There is something burning

b. (∃x: x *is a person*) x *is at the door*
someone is such that (he or she is at the door)

Someone is at the door

c. (∃x: x *is a fire*) *Tamara reported* x
Some fire is such that (Tamara reported it)

Tamara reported a fire

d. ¬ (∃x: x *is a person* ∧ x *was in the room*) x *knew Sam*
¬ (∃x: x *was a person in the room*) x *knew Sam*
¬ *someone in the room is such that (he or she knew Sam)*
¬ *someone in the room knew Sam*

No one in the room knew Sam

e. (∃x: x *is a vase*) (*Vic touched* x ∧ x *shattered*)
(∃x: x *is a vase*) (*Vic touched* x *and* x *shattered*)
A vase is such that (Vic touched it and it shattered)

Vic touched a vase and it shattered

f. ∃x (x *had happened* ∧ *Jane left to deal with* x)
∃x x *had happened and Jane left to deal with* x
something is such that (it had happened and Jane left to deal with it)

Something had happened and Jane left to deal with it

g. ∃x (*Ann forgot* x ∧ *Bill remembered* x)
∃x (*Ann forgot* x *and Bill remembered* x)
something is such that (Ann forgot it and Bill remembered it)

Ann forgot something and Bill remembered it
or: There is something that Ann forgot and Bill remembered

h. (∃x: x *was fast* ∧ x *was heavy*) *the instrument detected* x
(∃x: x *was fast and heavy*) *the instrument detected* x
(∃x: x *is a thing that was fast and heavy*) *the instrument detected* x
Something that was fast and heavy was such that (the instrument detected it)

The instrument detected something that was fast and heavy
or: The instrument detected something fast and heavy