

6.2.xa. Exercise answers

1. a. Reagan's vice president was the 41st president.

Reagan's vice president = the 41st president

$[\lambda x (x \text{'s vice president})]$ Reagan = $[\lambda x (\text{the } x\text{th president})]$ 41

vr = pf
v of r is p of f

[p: $\lambda x (\text{the } x\text{th president})$; v: $\lambda x (x \text{'s vice president})$; f: 41; r: Reagan]

- b. Tom found a fly in his soup and he called the waiter

Tom found a fly in his soup \wedge Tom called the waiter

Tom found a fly in Tom's soup \wedge Tom called the waiter

$[\lambda xy (x \text{ found a fly in } y)]$ Tom Tom's soup \wedge $[\lambda xy (x \text{ called } y)]$

Tom the waiter

Ft(Tom's soup) \wedge Ctr

Ft($[\lambda x (x \text{'s soup})]$ Tom) \wedge Ctr

Ft(st) \wedge Ctr
both F fits t 'n s of t and C fits t 'n r

[C: $\lambda xy (x \text{ called } y)$; F: $\lambda xy (x \text{ found a fly in } y)$; s: $\lambda x (x \text{'s soup})$; r: the waiter; t: Tom]

- c. Tom found the book everyone had talked to him about and he bought a copy of it

Tom found the book everyone had talked to him about \wedge Tom bought a copy of the book everyone had talked to him about

Tom found the book everyone had talked to Tom about \wedge Tom bought a copy of the book everyone had talked to Tom about

$[\lambda xy (x \text{ found } y)]$ Tom the book everyone had talked to Tom about \wedge $[\lambda xy (x \text{ bought a copy of } y)]$ Tom the book everyone had talked to Tom about

Ft(the book everyone had talked to Tom about) \wedge Bt(the book everyone had talked to Tom about)

Ft($[\lambda x (\text{the book everyone had talked to } x \text{ about})]$ Tom) \wedge Bt($[\lambda x (\text{the book everyone had talked to } x \text{ about})]$ Tom)

Ft(bt) \wedge Bt(bt)
both F fits t 'n b of t and B fits t 'n b of t

[B: $\lambda xy (x \text{ bought a copy of } y)$; F: $\lambda xy (x \text{ found } y)$; b: $\lambda x (\text{the book everyone had talked to } x \text{ about})$; t: Tom]

- d. *Wabash College is located in Crawfordsville, which is the seat of Montgomery County*

Wabash College is located in Crawfordsville \wedge Crawfordsville is the seat of Montgomery County

$[\lambda xy (x \text{ is located in } y)]$ Wabash College Crawfordsville \wedge Crawfordsville = the seat of Montgomery County

$Lbc \wedge c = [\lambda x (\text{the seat of } x)]$ Montgomery County

$Lbc \wedge c = sm$

both L fits b 'n c and c is s of m

[L: $\lambda xy (x \text{ is located in } y)$; s: $\lambda x (\text{the seat of } x)$; b: *Wabash*; c: *Crawfordsville*; m: *Montgomery County*]

- e. *Sue and Tom set the date of their wedding but didn't decide on its location*

Sue and Tom set the date of their wedding

\wedge *Sue and Tom didn't decide on the location of their wedding*

Sue and Tom set the date of Sue and Tom's wedding

$\wedge \neg$ Sue and Tom decided on the location of Sue and Tom's wedding

$[\lambda xyz (x \text{ and } y \text{ set } z)]$ Sue Tom the date of Sue and Tom's wedding

$\wedge \neg$ $[\lambda xyz (x \text{ and } y \text{ decided on } z)]$ Sue Tom the location of Sue and Tom's wedding

Sst(*the date of Sue and Tom's wedding*)

$\wedge \neg$ Dst(*the location of Sue and Tom's wedding*)

Sst($[\lambda x (\text{the date of } x)]$ Sue and Tom's wedding)

$\wedge \neg$ Dst($[\lambda x (\text{the location of } x)]$ Sue and Tom's wedding)

Sst(d(Sue and Tom's wedding)) $\wedge \neg$ Dst(l(Sue and Tom's wedding))

Sst(d($[\lambda xy (x \text{ and } y \text{'s wedding})]$ Sue Tom))

$\wedge \neg$ Dst(l($[\lambda xy (x \text{ and } y \text{'s wedding})]$ Sue Tom))

$Sst(d(wst)) \wedge \neg Dst(l(wst))$

both S fits s, t, 'n d of (w of s 'n t) and not D fits s, t, 'n l of (w of s 'n t)

[D: $\lambda xyz (x \text{ and } y \text{ decided on } z)$; S: $\lambda xyz (x \text{ and } y \text{ set } z)$; d: $\lambda x (\text{the date of } x)$; l: $\lambda x (\text{the location of } x)$; w: $\lambda xy (x \text{ and } y \text{'s wedding})$; s: *Sue*; t: *Tom*]

2. a. $([\lambda xy (x \text{ has spoken to } y)] \underline{\text{Ann Bill}} \wedge \neg [\lambda xy (x \text{ has spoken to } y)] \underline{\text{Ann}} ([\lambda x (x\text{'s father})] \underline{\text{Carol}})) \rightarrow \neg \underline{\text{Bill}} = [\lambda x (x\text{'s father})] \underline{\text{Carol}}$
(Ann has spoken to Bill \wedge \neg [Ann has spoken to Carol's father]) \rightarrow \neg Bill = Carol's father
(Ann has spoken to Bill \wedge \neg Ann has spoken to Carol's father) \rightarrow \neg Bill is Carol's father
(Ann has spoken to Bill \wedge Ann hasn't spoken to Carol's father) \rightarrow Bill isn't Carol's father
Ann has spoken to Bill but not to Carol's father \rightarrow Bill isn't Carol's father
If Ann has spoken to Bill but not to Carol's father, then Bill isn't Carol's father
- b. $(\text{B}([\lambda x (x\text{'s father})] \underline{\text{Ann}})([\lambda x (x\text{'s mother})] \underline{\text{Bill}}) \vee \text{S}([\lambda x (x\text{'s mother})] \underline{\text{Ann}})([\lambda x (x\text{'s father})] \underline{\text{Bill}})) \rightarrow [\lambda xy (x \text{ and } y \text{ are cross-cousins})] \underline{\text{Ann Bill}}$
 $([\lambda xy (x \text{ is a brother of } y)] \underline{\text{Ann's father Bill's mother}} \vee [\lambda xy (x \text{ is a sister of } y)] \underline{\text{Ann's mother Bill's father}}) \rightarrow \text{Ann and Bill are cross-cousins}$
(Ann's father is a brother of Bill's mother \vee Ann's mother is a sister of Bill's father) \rightarrow Ann and Bill are cross-cousins
Ann's father is a brother of Bill's mother or Ann's mother is a sister of Bill's father \rightarrow Ann and Bill are cross-cousins
If Ann's father is a brother of Bill's mother or Ann's mother is a sister of Bill's father, then Ann and Bill are cross-cousins
- c. $\text{Pab}(\text{m}([\lambda x (x\text{'s proposal})] \underline{\text{Bill}})([\lambda x (x\text{'s proposal})] \underline{\text{Carol}})) \wedge \text{Pac}(\text{m}([\lambda x (x\text{'s proposal})] \underline{\text{Bill}})([\lambda x (x\text{'s proposal})] \underline{\text{Carol}}))$
 $\text{Pab}([\lambda xy (\text{the best compromise between } x \text{ and } y)] \underline{\text{Bill's proposal Carol's proposal}})$
 $\wedge \text{Pac}([\lambda xy (\text{the best compromise between } x \text{ and } y)] \underline{\text{Bill's proposal Carol's proposal}})$
 $[\lambda xyz (x \text{ persuaded } y \text{ to accept } z)] \underline{\text{Ann Bill the best compromise between Bill's proposal and Carol's proposal}}$
 $\wedge [\lambda xyz (x \text{ persuaded } y \text{ to accept } z)] \underline{\text{Ann Carol the best compromise between Bill's proposal and Carol's proposal}}$
Ann persuaded Bill to accept the best compromise between his and Carol's proposals
 \wedge *Ann persuaded Carol to accept the best compromise between Bill's proposal and hers*
Ann persuaded each of Bill and Carol to accept the best compromise between their proposals