1. Part 1 (Lexicon) Translate each of the following into the hyper-lambda-calculus.

	Morpheme	Type	Translation
(1)	every	$C \to \bigwedge D$	$\lambda P_0 \bigwedge\{x \mid Px\}$
(2)	some	$C \to \bigvee D$	$\lambda P_0 \bigvee\{x \mid Px\}$
(3)	no	$C \to \bigwedge\{S \to S \times D\}$	$\lambda P_0 \bigwedge\{\neg \times x \mid Px\}$
(4)	any	$C \to$ ЛD	λP_0Л$\{x \mid Px\}$
(5)	a	$C \to C$	$\lambda P_0 \lambda x_0\{ \mathbf{1}(P)[x] \}$
(6)	one	$C \to C$	$\lambda P_0 \lambda x_0\{ \mathbf{1}(P)[x] \}$
(7)	two	$C \to C$	$\lambda P_0 \lambda x_0\{ \mathbf{2}(P)[x] \}$
(8)	three	$C \to C$	$\lambda P_0 \lambda x_0\{ \mathbf{3}(P)[x] \}$
(9)	at least	$(C \to C) \to (C \to \bigvee D)$	$\lambda \mathbf{N}_0 \lambda P_0 \bigvee\{ x \mid \mathbf{N}(P)[x] \}$
(10)	exactly	$(C \to C) \to (C \to \bigvee D)$	$\lambda \mathbf{N}_0 \lambda P_0 \boxtimes\{ x \mid \mathbf{N}(P)[x] \}$
(11)	and	$(S \times S) \to S$	$\lambda PQ\{P \& Q\}$
(12)	if	$S \to (S \to S)$	$\lambda P \lambda Q\{P \to Q\}$
(13)	does-not	$D_1 \to S. \to D_1 \to S$	$\lambda P_1 \lambda x_1 {\sim} Px$
(14)	woman	C	$\mathbf{W}_0$
(15)	man	C	$\mathbf{M}_0$
(16)	donkey	C	$\mathbf{D}_0$
(17)	enemy	$D_6 \to C$	$\lambda y_6 \lambda x_0 \mathbf{E}xy$
(18)	respects	$D_2 \to D_1 \to S$	$\lambda y_2 \lambda x_1 \mathbf{R}xy$
(19)	owns	$D_2 \to D_1 \to S$	$\lambda y_2 \lambda x_1 \mathbf{O}xy$
(20)	knows	$D_2 \to D_1 \to S$	$\lambda y_2 \lambda x_1 \mathbf{K}xy$
(21)	sells	$D_2 \to D_3 \to D_1 \to S$	$\lambda y_2 \lambda z_3 \lambda x_1 \mathbf{S}xyz$
(22)	mother(def)	$D_6 \to D$	$\lambda x_6\{\mathbf{m}(x)\}$
(23)	father(def)	$D_6 \to D$	$\lambda x_6\{\mathbf{f}(x)\}$
(24)	to	$D \to D_3$	$\lambda x\{x_3\}$
(25)	of [genitive]	$D \to D_6$	$\lambda x\{x_6\}$
(26)	's [genitive]	$D \to D_6$	$\lambda x\{x_6\}$
(27)	who	$D \to S. \to C \to C$	$\lambda Q \lambda P_0 \lambda x_0\{Px \& Qx\}$
(28)	he∣she∣it	$\varnothing$	$\varnothing$
(29)	[α]	$D \to D_\alpha$	$\lambda x\{x_\alpha\}$
(30)	(α)	$D_\alpha \to D$	$\lambda x_\alpha\{x\}$

2. Part 2 (Semantic Trees)

1. No man who owns a donkey sells it to any enemy of his.

no	man who owns a donkey	[+1]	[–1]	sells	(–2)	it	[+2]	to any enemy of his
$\lambda P_0 \wedge\{\neg \times x \mid Px\}$	[from below] $\Sigma\{\ \lambda x_0\{\mathbf{M}x\&\mathbf{O}xy\} \times y_{-2} \mid \mathbf{1D}y\ \}$	$\lambda x\{x_1\}$	$\lambda x\{x_{-1}\}$		$\lambda x_{-2}\{x\}$	$\varnothing$	$\lambda x\{x_2\}$	
$\Pi\ \{\ \wedge\{\neg \times x \mid \mathbf{M}x\&\mathbf{O}xy\ \} \times y_{-2} \mid \mathbf{1D}y\ \}$		$\lambda x\{x_1 \times x_{-1}\}$		$\lambda y_2 \lambda z_3 \lambda x_1 \mathbf{S}xyz$	$\lambda x_{-2}\{x_2\}$			[from below] $\lambda x_{-1}\ \text{Л}\{\ z_3 \mid \mathbf{E}zx\ \}$
$\Pi\ \{\ \wedge\{\neg \times x_1 \times x_{-1} \mid \mathbf{M}x\&\mathbf{O}xy\ \} \times y_{-2} \mid \mathbf{1D}y\ \}$				$\lambda y_{-2}\ \lambda z_3\ \lambda x_1\ \mathbf{S}xyz$				
				$\lambda y_{-2}\ \lambda x_{-1}\ \text{Л}\{\ \lambda x_1\ \mathbf{S}xyz \mid \mathbf{E}zx\ \}$				
$\Pi\ \{\ \wedge\{\neg \times x_1 \times x_{-1} \mid \mathbf{M}x\&\mathbf{O}xy\ \} \times \lambda x_{-1}\ \text{Л}\{\ \lambda x_1\ \mathbf{S}xyz \mid \mathbf{E}zx\ \} \mid \mathbf{1D}y\ \}$								
$\Pi\ \{\ \wedge\{\neg \times x_1 \times \text{Л}\{\ \lambda x_1\ \mathbf{S}xyz \mid \mathbf{E}zx\ \} \mid \mathbf{M}x\&\mathbf{O}xy\ \}\ \mid \mathbf{1D}y\ \}$								
$\Pi\ \{\ \wedge\{\neg \times \text{Л}\{\mathbf{S}xyz \mid \mathbf{E}zx\ \} \mid \mathbf{M}x\&\mathbf{O}xy\ \}\ \mid \mathbf{1D}y\ \}$								
$\Pi\ \{\ \wedge\{\ \wedge\{\sim\mathbf{S}xyz \mid \mathbf{E}zx\ \} \mid \mathbf{M}x\&\mathbf{O}xy\ \}\ \mid \mathbf{1D}y\ \}$								
$\forall y\{\ \mathbf{1D}y \rightarrow \forall x\{\ \{\mathbf{M}x\&\mathbf{O}xy\} \rightarrow \forall z\{\ \{\mathbf{E}zx \rightarrow \sim\mathbf{S}xyz\}\ \}\ \}\ \}$								

<table>
<tr><th>man</th><th>who</th><th>[+1]</th><th>owns</th><th>a</th><th>donkey</th><th>[+2]</th><th>[–2]</th></tr>
<tr><td></td><td>$\lambda Q \lambda P_0 \lambda x_0 \{Px \& Qx\}$</td><td>$\lambda x\{x_1\}$</td><td></td><td>$\lambda P_0 \lambda x_0 \{\mathbf{1}Px\}$</td><td>$\mathbf{D}x$</td><td>$\lambda x\{x_2\}$</td><td>$\lambda x\{x_{-2}\}$</td></tr>
<tr><td></td><td></td><td></td><td></td><td colspan="2">$\lambda x_0\{\mathbf{1D}x\}$</td><td colspan="2">$\lambda x\{x_2 \times x_{-2}\}$</td></tr>
<tr><td></td><td></td><td></td><td></td><td colspan="2">$\Sigma\{\ y \mid \mathbf{1D}y\ \}$</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>$\lambda y_2 \lambda x_1 \mathbf{O}xy$</td><td colspan="4">$\Sigma\{\ y_2 \times y_{-2} \mid \mathbf{1D}y\ \}$</td></tr>
<tr><td></td><td colspan="2">$\lambda Q_1 \lambda P_0 \lambda x_0 \{Px \& Qx\}$</td><td colspan="5">$\Sigma\{\ \lambda x_1 \mathbf{O}xy \times y_{-2} \mid \mathbf{1D}y\ \}$</td></tr>
<tr><td>$\mathbf{M}_0$</td><td colspan="7">$\Sigma\{\ \lambda P_0 \lambda x_0 \{Px \& \mathbf{O}xy\} \times y_{-2} \mid \mathbf{1D}y\ \}$</td></tr>
<tr><td colspan="8">$\Sigma\{\ \lambda x_0 \{\mathbf{M}x \& \mathbf{O}xy\} \times y_{-2} \mid \mathbf{1D}y\ \}$</td></tr>
</table>

<table>
<tr><th>to</th><th>any</th><th>enemy</th><th>of</th><th>(–1)</th><th>his</th></tr>
<tr><td></td><td></td><td></td><td>$\lambda x\{x_6\}$</td><td>$\lambda x_{-1}\{x\}$</td><td>$\varnothing$</td></tr>
<tr><td></td><td></td><td>$\lambda y_6 \lambda x_0 \mathbf{E}xy$</td><td colspan="3">$\lambda x_{-1}\{x_6\}$</td></tr>
<tr><td></td><td>$\lambda P_0 \text{Л}\{x \mid Px\}$</td><td colspan="4">$\lambda x_{-1}\ \lambda y_0 \mathbf{E}yx$</td></tr>
<tr><td>$\lambda x\{x_3\}$</td><td colspan="5">$\lambda x_{-1}\ \text{Л}\{\ y \mid \mathbf{E}yx\ \}$</td></tr>
<tr><td colspan="6">$\lambda x_{-1}\ \text{Л}\{\ y_3 \mid \mathbf{E}yx\ \}$</td></tr>
</table>

2. No man respects any woman who does not respect any woman [whom] he respects.

<table>
<tr><td>no</td><td>man</td><td>[+1]</td><td>[−1]</td><td>respects</td><td>any</td><td>woman who does-not respect any woman whom he respects</td><td>[+2]</td></tr>
<tr><td>$\lambda P_0 \wedge \{\neg \times x \mid Px\}$</td><td>$\mathbf{M}_0$</td><td>$\lambda x\{x_1\}$</td><td>$\lambda x\{x_{-1}\}$</td><td rowspan="3">$\lambda y_2 \lambda x_1 \mathbf{R}xy$</td><td>$\lambda P_0$ Л $\{ x \mid Px \}$</td><td>(insert material from below)
$\lambda x_{-1}\, \lambda z_0 \{ \mathbf{W}z \;\&\; \forall y \{ \{ \mathbf{W}y \;\&\; \mathbf{R}xy \} \rightarrow {\sim}\mathbf{R}zy \} \}$</td><td rowspan="3">$\lambda x\{x_2\}$</td></tr>
<tr><td colspan="2">$\lambda P_0 \wedge \{ \neg \times x \mid \mathbf{M}x \}$</td><td colspan="2">$\lambda x\{x_1 \times x_{-1}\}$</td><td colspan="2">$\lambda x_{-1}$ Л $\{ z \mid \mathbf{W}z \;\&\; \forall y \{ \{ \mathbf{W}y \;\&\; \mathbf{R}xy \} \rightarrow {\sim}\mathbf{R}zy \} \}$</td></tr>
<tr><td colspan="4" rowspan="2">$\lambda P_0 \wedge \{ \neg \times x_1 \times x_{-1} \mid \mathbf{M}x \}$</td><td colspan="2">$\lambda x_{-1}$ Л $\{ z_2 \mid \mathbf{W}z \;\&\; \forall y \{ \{ \mathbf{W}y \;\&\; \mathbf{R}xy \} \rightarrow {\sim}\mathbf{R}zy \} \}$</td></tr>
<tr><td colspan="4">λx_{-1} Л$\{ \lambda x_1 \mathbf{R}xz \mid \mathbf{W}z \;\&\; \forall y \{ \{ \mathbf{W}y \;\&\; \mathbf{R}xy \} \rightarrow {\sim}\mathbf{R}zy \} \}$</td></tr>
<tr><td colspan="8">$\wedge\{\neg \times x_1 \times$ Л$\{ \lambda x_1 \mathbf{R}xz \mid \mathbf{W}z \;\&\; \forall y \{ \{ \mathbf{W}y \;\&\; \mathbf{R}xy \} \rightarrow {\sim}\mathbf{R}zy \} \} \mid \mathbf{M}x \}$</td></tr>
<tr><td colspan="8">$\wedge\{ \wedge\{ {\sim}\mathbf{R}xz \mid \mathbf{W}z \;\&\; \forall y \{ \{ \mathbf{W}y \;\&\; \mathbf{R}xy \} \rightarrow {\sim}\mathbf{R}zy \} \} \mid \mathbf{M}x \}$</td></tr>
<tr><td colspan="8">$\forall x \{ \mathbf{M}x \rightarrow \forall z \{ \{\mathbf{W}z \;\&\; \forall y \{\{\mathbf{W}y \;\&\; \mathbf{R}xy \} \rightarrow {\sim}\mathbf{R}zy\}\} \rightarrow {\sim}\mathbf{R}xz\} \}$</td></tr>
</table>

<table>
<tr><th>woman</th><th>who</th><th>[+1]</th><th>does-not</th><th>respect</th><th>any woman whom he respects</th><th>[+2]</th></tr>
<tr><td></td><td>$\lambda Q \lambda P_0 \lambda x_0\{Px \& Qx\}$</td><td>$\lambda x\{x_1\}$</td><td></td><td></td><td>(insert material from below)
λx_{-1} Л$\{\, y \mid \mathbf{W}y \,\&\, \mathbf{R}xy \,\}$</td><td>$\lambda x\{x_2\}$</td></tr>
<tr><td></td><td></td><td></td><td></td><td>$\lambda y_2 \lambda x_1 \mathbf{R}xy$</td><td colspan="2">$\lambda x_{-1}$ Л$\{\, y_2 \mid \mathbf{W}y \,\&\, \mathbf{R}xy \,\}$</td></tr>
<tr><td></td><td></td><td></td><td>$\lambda P_1 \lambda x_1 {\sim} Px$</td><td colspan="3">$\lambda x_{-1}$ Л$\{\, \lambda x_1 \mathbf{R}xy \mid \mathbf{W}y \,\&\, \mathbf{R}xy \,\}$</td></tr>
<tr><td></td><td></td><td></td><td colspan="4">$\lambda x_{-1} \wedge\{\, \lambda z_1 {\sim} \mathbf{R}zy \mid \mathbf{W}y \,\&\, \mathbf{R}xy \,\}$</td></tr>
<tr><td></td><td></td><td></td><td colspan="4">$\lambda x_{-1}\, \lambda z_1 \wedge\{ {\sim} \mathbf{R}zy \mid \mathbf{W}y \,\&\, \mathbf{R}xy \,\}$</td></tr>
<tr><td></td><td colspan="2">$\lambda Q_1 \lambda P_0 \lambda x_0\{Px \& Qx\}$</td><td colspan="4">$\lambda x_{-1}\, \lambda z_1\, \forall y \,\{\, \{\, \mathbf{W}y \,\&\, \mathbf{R}xy \,\} \to {\sim}\mathbf{R}zy \,\}$</td></tr>
<tr><td>$\mathbf{W}_0$</td><td colspan="6">$\lambda x_{-1}\, \lambda z_1\, \forall y \,\{\, \{\, \mathbf{W}y \,\&\, \mathbf{R}xy \,\} \to {\sim}\mathbf{R}zy \,\}$</td></tr>
<tr><td colspan="7">$\lambda x_{-1}\, \lambda P_0\, \lambda z_0\{\, Pz \,\&\, \forall y \,\{\, \{\, \mathbf{W}y \,\&\, \mathbf{R}xy \,\} \to {\sim}\mathbf{R}zy \,\}\,\}$</td></tr>
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<table>
<tr><th>any</th><th>woman</th><th>who</th><th>m[+2]</th><th>(–1)</th><th>he</th><th>[+1]</th><th>respects</th></tr>
<tr><td></td><td></td><td>$\lambda Q \lambda P_0 \lambda x_0\{Px \& Qx\}$</td><td>$\lambda x\{x_2\}$</td><td>$\lambda x_{-1}\{x\}$</td><td>$\varnothing$</td><td>$\lambda x\{x_1\}$</td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td colspan="3">$\lambda x_{-1}\{x_1\}$</td><td>$\lambda y_2 \lambda x_1 \mathbf{R}xy$</td></tr>
<tr><td></td><td></td><td colspan="2">$\lambda Q_2\, \lambda P_0\, \lambda x_0\{Px \& Qx\}$</td><td colspan="4">$\lambda x_{-1}\, \lambda y_2\, \mathbf{R}xy$</td></tr>
<tr><td></td><td>$\mathbf{W}_0$</td><td colspan="6">$\lambda x_{-1}\, \lambda P_0\, \lambda y_0 \,\{\, Py \,\&\, \mathbf{R}xy \,\}$</td></tr>
<tr><td>λP_0Л$\{y \mid Py\}$</td><td colspan="7">$\lambda y_0 \,\{\, \mathbf{W}y \,\&\, \mathbf{R}xy \,\}$</td></tr>
<tr><td colspan="8">λx_{-1} Л$\{\, y \mid \mathbf{W}y \,\&\, \mathbf{R}xy \,\}$</td></tr>
</table>

3. If a man respects a woman, and she does respect him, then she knows his mother and father.

<table>
<tr><th>if</th><th>a</th><th>man</th><th>[+1]</th><th>[–1]</th><th>respects a woman</th><th>and</th><th>she does
not respect him</th><th>then</th><th>she knows
his mother and father</th></tr>
<tr><td rowspan="6">$\lambda P \lambda Q\{P \rightarrow Q\}$</td><td>$\varnothing$</td><td>$\mathbf{M}_0$</td><td>$\lambda x\{x_1\}$</td><td>$\lambda x\{x_{-1}\}$</td><td rowspan="4">(insert material from below)
$\Sigma\{ \lambda x_1 \mathbf{R}xy \times y_{-2} \mid \mathbf{W}y \}$</td><td rowspan="5">$\lambda PQ\{P \& Q\}$</td><td rowspan="5">(insert material from below)
$\lambda y_{-2}\, \lambda x_{-1} \sim\mathbf{R}yx$</td><td>$\varnothing$</td><td>$\lambda x_{-1}\, \lambda z_{-2} \{ \mathbf{K}[z,\mathbf{m}(x)] \; \& \; \mathbf{K}[z,\mathbf{f}(x)] \}$</td></tr>
<tr><td colspan="2">$\mathbf{M}_0$</td><td colspan="2" rowspan="2">$\lambda x\{x_1 \times x_{-1}\}$</td><td colspan="2" rowspan="6">(insert material from below)
$\lambda x_{-1}\, \lambda z_{-2} \{ \mathbf{K}[z,\mathbf{m}(x)] \; \& \; \mathbf{K}[z,\mathbf{f}(x)] \}$</td></tr>
<tr><td colspan="2">$\Sigma\{ x \mid \mathbf{M}x \}$</td></tr>
<tr><td colspan="4">$\Sigma\{ x_1 \times x_{-1} \mid \mathbf{M}x \}$</td></tr>
<tr><td colspan="5">$\Sigma\{ \Sigma\{ \mathbf{R}xy \times y_{-2} \mid \mathbf{W}y \} \times x_{-1} \mid \mathbf{M}x \}$</td></tr>
<tr><td colspan="7">$\Sigma\{ \Sigma\{ \mathbf{R}xy \; \& \sim\mathbf{R}yx \mid \mathbf{W}y \} \mid \mathbf{M}x \}$</td></tr>
<tr><td colspan="8">$\Pi\{ \Pi\{ \lambda Q\{\{\mathbf{R}xy \; \& \sim\mathbf{R}yx\} \rightarrow Q\} \times y_{-2} \times x_{-1} \mid \mathbf{W}y \} \mid \mathbf{M}x \}$</td></tr>
<tr><td colspan="10">$\Pi\{ \Pi\{ \lambda Q\{\{\mathbf{R}xy \; \& \sim\mathbf{R}yx\} \rightarrow Q\} \times y_{-2} \times \lambda z_{-2} \{ \mathbf{K}[z,\mathbf{m}(x)] \; \& \; \mathbf{K}[z,\mathbf{f}(x)] \} \mid \mathbf{W}y \} \mid \mathbf{M}x \}$</td></tr>
<tr><td colspan="10">$\Pi\{ \Pi\{ \lambda Q\{\{\mathbf{R}xy \; \& \sim\mathbf{R}yx\} \rightarrow Q\} \times \{ \mathbf{K}[y,\mathbf{m}(x)] \; \& \; \mathbf{K}[y,\mathbf{f}(x)] \} \mid \mathbf{W}y \} \mid \mathbf{M}x \}$</td></tr>
<tr><td colspan="10">$\Pi\{ \Pi\{ \{\mathbf{R}xy \; \& \sim\mathbf{R}yx\} \rightarrow \{\mathbf{K}[y,\mathbf{m}(x)] \; \& \; \mathbf{K}[y,\mathbf{f}(x)]\} \mid \mathbf{W}y \} \mid \mathbf{M}x \}$</td></tr>
<tr><td colspan="10">$\forall x \left\{ \mathbf{M}x \rightarrow \forall y \left\{ \mathbf{W}y \rightarrow \{ \{\mathbf{R}xy \; \& \sim\mathbf{R}yx\} \rightarrow \{\mathbf{K}[y,\mathbf{m}(x)] \; \& \; \mathbf{K}[y,\mathbf{f}(x)]\} \} \right\} \right\}$</td></tr>
</table>

<table>
<tr><th>respects</th><th>a</th><th>woman</th><th>[+2]</th><th>[–1]</th></tr>
<tr><td rowspan="5">$\lambda y_2 \lambda x_1 \mathbf{R}xy$</td><td>$\varnothing$</td><td>$\mathbf{W}_0$</td><td>$\lambda x\{x_2\}$</td><td>$\lambda x\{x_{-1}\}$</td></tr>
<tr><td colspan="2">$\mathbf{W}_0$</td><td colspan="2" rowspan="2">$\lambda x\{x_2 \times x_{-1}\}$</td></tr>
<tr><td colspan="2">$\Sigma\{ y \mid \mathbf{W}y \}$</td></tr>
<tr><td colspan="4">$\Sigma\{ y_2 \times y_{-2} \mid \mathbf{W}y \}$</td></tr>
<tr><td colspan="4"></td></tr>
<tr><td colspan="5">$\Sigma\{ \lambda x_1 \mathbf{R}xy \times y_{-2} \mid \mathbf{W}y \}$</td></tr>
</table>

<table>
<tr><td>(–2)</td><td>she</td><td>[+1]</td><td>does not</td><td>respect</td><td>(–1)</td><td>him</td><td>[+2]</td></tr>
<tr><td>$\lambda x_{-2}\{x\}$</td><td>∅</td><td>$\lambda x\{x_1\}$</td><td rowspan="3">$\lambda P_1 \lambda x_1 {\sim} Px$</td><td rowspan="2">$\lambda y_2 \lambda x_1 \mathbf{R}xy$</td><td>$\lambda x_{-1}\{x\}$</td><td>∅</td><td>$\lambda x\{x_2\}$</td></tr>
<tr><td colspan="3" rowspan="3">$\lambda x_{-2}\{x_1\}$</td><td colspan="3">$\lambda x_{-1}\{x_2\}$</td></tr>
<tr><td colspan="4">$\lambda y_{-1}\ \lambda x_1\ \mathbf{R}xy$</td></tr>
<tr><td colspan="5">$\lambda y_{-1}\ \lambda x_1\ {\sim}\mathbf{R}xy$</td></tr>
<tr><td colspan="8">$\lambda y_{-2}\ \lambda x_{-1}\ {\sim}\mathbf{R}yx$</td></tr>
</table>

<table>
<tr><td>(–2)</td><td>she</td><td>[+1]</td><td>knows</td><td>(–1)</td><td>he</td><td>'s</td><td>mother</td><td>and</td><td>father</td><td>[+2]</td></tr>
<tr><td>$\lambda x_{-2}\{x\}$</td><td>∅</td><td>$\lambda x\{x_1\}$</td><td rowspan="4">$\lambda y_2 \lambda x_1 \mathbf{K}xy$</td><td>$\lambda x_{-1}\{x\}$</td><td>∅</td><td>$\lambda x\{x_6\}$</td><td>$\lambda x_6\{\mathbf{m}(x)\}$</td><td>$\lambda PQ\{P\&Q\}$</td><td>$\lambda x_6\{\mathbf{f}(x)\}$</td><td rowspan="2">$\lambda x\{x_2\}$</td></tr>
<tr><td colspan="3" rowspan="4">$\lambda x_{-2}\{x_1\}$</td><td colspan="3" rowspan="2">$\lambda x_{-1}\{x_6\}$</td><td colspan="3">$\lambda x_6\ \lambda P\{P[\mathbf{m}(x)]\ \&\ P[\mathbf{f}(x)]\}$</td></tr>
<tr><td colspan="4">$\lambda x_6\ \lambda P_2\{P[\mathbf{m}(x)]\ \&\ P[\mathbf{f}(x)]\}$</td></tr>
<tr><td colspan="7">$\lambda x_{-1}\ \lambda P_2\{\ P[\mathbf{m}(x)]\ \&\ P[\mathbf{f}(x)]\ \}$</td></tr>
<tr><td colspan="8">$\lambda x_{-1}\ \lambda z_1\ \{\ \mathbf{K}[z,\mathbf{m}(x)]\ \&\ \mathbf{K}[z,\mathbf{f}(x)]\ \}$</td></tr>
<tr><td colspan="11">$\lambda x_{-1}\ \lambda z_{-2}\ \{\ \mathbf{K}[z,\mathbf{m}(x)]\ \&\ \mathbf{K}[z,\mathbf{f}(x)]\ \}$</td></tr>
</table>

4. Exactly one man respects exactly one woman who does not respect him.

exactly	one	man	[+1]	[−1]	respects	exactly	one	woman who does not respect him	[+2]
$\lambda N_0 \lambda P_0 \boxtimes \{x \mid N(P)x\}$	$\mathbf{1}_0$		$\lambda x\{x_1\}$	$\lambda x\{x_{-1}\}$		$\lambda N_0 \lambda P_0 \boxtimes \{y \mid N(P)y\}$	$\mathbf{1}_0$		$\lambda x\{x_2\}$
$\lambda P_0 \boxtimes \{ x \mid \mathbf{1}(P)x \}$		$\mathbf{M}_0$				$\lambda P_0 \boxtimes \{ y \mid \mathbf{1}(P)y \}$		[insert material from below] $\lambda x_{-1}\, \lambda y_0\, \{\mathbf{W}y\ \&\ {\sim}\mathbf{R}yx\}$	
$\boxtimes \{ x \mid \mathbf{1}(\mathbf{M})x \}$			$\lambda x\{x_1 \times x_{-1}\}$			$\boxtimes \{ y \mid \mathbf{1}(\lambda y\{\mathbf{W}y \& {\sim}\mathbf{R}yx\})y \}$			
					$\lambda y_2 \lambda x_1 \mathbf{R}xy$	$\lambda x_{-1}\, \boxtimes \{ y_2 \mid \mathbf{1}(\lambda y\{\mathbf{W}y \& {\sim}\mathbf{R}yx\})y \}$			
$\boxtimes \{ x_1 \times x_{-1} \mid \mathbf{1}(\mathbf{M})x \}$					$\lambda x_{-1}\, \boxtimes \{ \lambda x_1 \mathbf{R}xy \mid \mathbf{1}(\lambda y\{\mathbf{W}y \& {\sim}\mathbf{R}yx\})y \}$				
$\boxtimes \{ x_1 \times \boxtimes \{ \lambda x_1 \mathbf{R}xy \mid \mathbf{1}(\lambda y\{\mathbf{W}y \& {\sim}\mathbf{R}yx\})y \} \mid \mathbf{1}(\mathbf{M})x \}$									
$\boxtimes \{ \boxtimes \{ \mathbf{R}xy \mid \mathbf{1}(\lambda y\{\mathbf{W}y \& {\sim}\mathbf{R}yx\})y \} \mid \mathbf{1}(\mathbf{M})x \}$									
$\exists! x\ \{ \mathbf{1}(\mathbf{M})x\ \&\ \exists! y\ \{ \mathbf{1}(\lambda y\{\mathbf{W}y \& {\sim}\mathbf{R}yx\})y\ \&\ \mathbf{R}xy \} \}$									
$\exists! x\ \{ \mathbf{M}x\ \&\ \exists! y\ \{ \{\mathbf{W}y \& {\sim}\mathbf{R}yx\}\ \&\ \mathbf{R}xy \} \}$									

woman	who	[+1]	does not	respect	(−1)	him	[+2]
	$\lambda Q \lambda P_0 \lambda x_0\{Px \& Qx\}$	$\lambda x\{x_1\}$			$\lambda x_{-1}\{x\}$	$\varnothing$	$\lambda x\{x_2\}$
			$\lambda P_1 \lambda x_1 {\sim}Px$	$\lambda y_2 \lambda x_1 \mathbf{R}xy$			
			$\lambda y_2 \lambda x_1 {\sim}\mathbf{R}xy$		$\lambda x_{-1}\{x_2\}$		
	$\lambda Q_1 \lambda P_0 \lambda x_0\{Px \& Qx\}$		$\lambda y_{-1} \lambda x_1 {\sim}\mathbf{R}xy$				
$\mathbf{W}_0$	$\lambda y_{-1}\, \lambda P_0\, \lambda x_0\{Px\ \&\ {\sim}\mathbf{R}xy\}$						
$\lambda y_{-1}\, \lambda x_0\{ \mathbf{W}x\ \&\ {\sim}\mathbf{R}xy \}$							
$\lambda x_{-1}\, \lambda y_0\, \{ \mathbf{W}y\ \&\ {\sim}\mathbf{R}yx \}$							