Question 5.

(a)

$$G_0 = \langle member(A, [2,3]) \mid true \rangle$$

R_1 (down-left) → $\langle \square \mid A = 2 \rangle$

R_2 (down) → $\langle member(A, [3]) \mid true \rangle$

From $\langle member(A, [3]) \mid true \rangle$:

R_1 → $\langle \square \mid A = 3 \rangle$

R_2 → $\langle member(A, []) \mid true \rangle$

From $\langle member(A, []) \mid true \rangle$:

R_1 → $\langle \blacksquare \mid false \rangle$

R_2 → $\langle \blacksquare \mid false \rangle$

(b)

$$G_0 = \langle member(2, As) \mid true \rangle$$

R_1 → $\langle \square \mid As = [2 \mid Xs] \rangle$

R_2 → $\langle member(2, Xs) \mid As = [X \mid Xs] \rangle$

From $\langle member(2, Xs) \mid As = [X \mid Xs] \rangle$:

R_1 → $\langle \square \mid As = [X, 2 \mid Xs'] \rangle$

R_2 → $\langle member(2, Xs') \mid As = [X, X' \mid Xs'] \rangle$

From $\langle member(2, Xs') \mid As = [X, X' \mid Xs'] \rangle$:

R_1 → $\langle \square \mid As = [X, X', 2 \mid Xs''] \rangle$

$R_?$ → $\ldots\ldots$

(infinite tree)