R_1 reverse $([\,], [\,])$.

R_2 reverse $([x|Xs], Ys) :-$ reverse (Xs, Rs), append $(Rs, [x], Ys)$.

R_3 append $([\,], Ys, Ys)$.

R_4 append $([x|Xs], Ys, [x|Zs]) :-$ append (Xs, Ys, Zs).

$G_0 :$ $\langle$reverse $([1,2,3], As) \mid$ true$\rangle$

$\Downarrow R_1$ $\Downarrow R_2$

$\langle\blacksquare \mid$ false$\rangle$ $\langle$reverse $([2,3], Rs)$, append $(Rs, [1], As) \mid$ true$\rangle$

R_4 R_2

$\langle\blacksquare \mid$ false$\rangle$ $\langle$reverse $([3], Rs')$, append $(Rs', [2], Rs)$, append $(Rs, [1], As) \mid$ true$\rangle$

$\Downarrow R_1$ $\Downarrow R_2$

$\langle\blacksquare \mid$ false$\rangle$ $\langle$reverse $([\,], Rs'')$, append $(Rs'', [3], Rs')$, append $(Rs', [2], Rs)$,

                           append $(Rs, [1], As) \mid$ true$\rangle$

$\Downarrow R_1$ $\Downarrow R_2$

                                         $\langle\blacksquare \mid$ false$\rangle$

$\langle$append $([\,], [3], Rs')$, append $(Rs', [2], Rs)$, append $(Rs, [1], As) \mid$ true$\rangle$

$\Downarrow R_3$ $\Downarrow R_4$

                                          $\langle\blacksquare \mid$ false$\rangle$

$\langle$append $([3], [2], Rs)$, append $(Rs, [1], As) \mid$ true$\rangle$

$\Downarrow R_3$ $\Downarrow R_4$

$\langle\blacksquare \mid$ false$\rangle$ $\langle$append $([\,], [2], Zs)$, append $(Rs, [1], As) \mid Rs = [3|Zs] \rangle$

R_3 $\Downarrow R_4$

$\langle$append $([3,2], [1], As) \mid$ true$\rangle$ $\langle\blacksquare \mid$ false$\rangle$

$\Downarrow R_3$ $\Downarrow R_4$

$\langle\blacksquare \mid$ false$\rangle$ $\langle$append $([2], [1], Zs) \mid As = [3|Zs]\rangle$

R_3 $\Downarrow R_4$

$\langle\blacksquare \mid$ false$\rangle$ $\langle$append $([\,], [1], Zs') \mid As = [3,2|Zs']\rangle$

$\Downarrow R_3$ $\Downarrow R_4$

$\langle[\,] \mid As = [3,2,1]\rangle$ $\langle\blacksquare \mid$ false$\rangle$