Exercise 3.4

(a) $_2p_{[72]} = p_{[72]} \cdot p_{[72]+1} = (1 - q_{[72]})(1 - q_{[72]+1}) = (1 - 0.005236)(1 - 0.007456) = 0.987347$

(b) $_3q_{[73]+2} = 1 - {}_3p_{[73]+2} = \underbrace{1 - (1 - q_{[73]+1})(1 - q_{[73]+3})(1 - q_{[73]+4})}_{1-(1-0.011370)(1-0.014988)(1-0.019316)} = 0.04499775$

(c) $_{1|}q_{[65]+4} = (1 - q_{[65]+4}) \cdot q_{70} = (1 - 0.007994)0.010599 = 0.01051427$

(d) We have

$$
\begin{aligned}
_7p_{[70]} &= p_{[70]} \cdot p_{[70]+1} \cdot p_{[70]+2} \cdot p_{[70]+3} \cdot p_{[70]+4} \cdot p_{75} \cdot p_{76} \\
&= (1 - q_{[70]})(1 - q_{[70]+1})(1 - q_{[70]+2})(1 - q_{[70]+3})(1 - q_{[70]+4})(1 - q_{75})(1 - q_{76}) \\
&= (1 - 0.004285)(1 - 0.005967)(1 - 0.008066)(1 - 0.010629)(1 - 0.013698) \\
&\qquad \times (1 - 0.018774)(1 - 0.021053) \\
&= 0.9202714.
\end{aligned}
$$