

## Exercise 3.2.1

$$a) \quad P^2 = P \cdot P = \begin{bmatrix} 47/100 & 13/100 & 40/100 \\ 42/100 & 14/100 & 44/100 \\ 26/100 & 17/100 & 57/100 \end{bmatrix}$$

$$b) \quad P(X_3 = 1 \mid X_1 = 0) = (P^2)_{12} = \frac{13}{100}$$

$$\begin{aligned} c) \quad P(X_3 = 1 \mid X_0 = 0) &= (P^3)_{12} \\ &= \sum_{k=1}^3 P_{1k} (P^2)_{k2} \\ &= \frac{1}{10} \cdot \frac{13}{100} + \frac{2}{10} \cdot \frac{14}{100} + \frac{7}{10} \cdot \frac{17}{100} \\ &= \frac{16}{100} \end{aligned}$$