8.18 \[ \frac{1}{2} \times \frac{1}{10} + \frac{1}{2} \times \frac{1}{25} = \frac{7}{100} \]

8.19
1. \[ \frac{1}{2} + \frac{2}{3} \times \frac{1}{2} = \frac{1}{2} \]
2. \[ \frac{1}{2} \times \frac{3}{2} = \frac{3}{4} \]

8.20 \[ \frac{2}{5} \times \frac{1}{2} + \left( \frac{3}{5} \times \frac{1}{4} \right) \times \frac{1}{2} \times \frac{1}{2} = \frac{15}{40} = \frac{3}{8} \]

8.21 \[ 1 - \frac{1}{3} \times \frac{1}{2} = \frac{5}{6} \]

8.22 \[ p^2 + 2pq, \quad p = p \]
\[ p = \frac{p^2}{1 - 2p(1-p)} = \frac{p^2}{1 - 2p + 2p^2} \]

8.23 Similar to 8.22, let \( p \) be the probability
\[ \frac{5}{36} \times \frac{1}{36} + \frac{5}{36} \times \frac{1}{36} \times p + \frac{25}{36} \times p + p = p \]
\[ \Rightarrow p = \frac{6}{13} \]

8.30 \[ \frac{0.1 \times 0.85}{0.1 \times 0.85 + 0.9 \times 0.25} = 0.2742 \]

8.31 \[ \frac{\frac{1}{5} \times \left( \frac{2}{5} \right)^3}{\frac{1}{5} \times \frac{3}{4} + \frac{4}{5} \times \left( \frac{1}{2} \right)^2} = 0.4576 = \frac{27}{59} \]

8.32 \[ \frac{1}{3} \times \frac{1}{2} + \frac{2}{3} \times \frac{1}{2} = \frac{1}{3} \]
\[ \frac{1}{3} \times \frac{1}{2} = \frac{1}{6} \]

8.33
1. \[ \frac{1}{2^2} = \frac{1}{4} \]
2. \[ \frac{1}{2^2} + \frac{2}{3} \times \left( \frac{1}{2} \right)^2 = \frac{13}{27} \]
3. \[ \frac{1}{2} \times \left( \frac{1}{2} \right)^2 + \frac{1}{2} \times \left( \frac{1}{2} \right)^2 \times \left( \frac{1}{2} \right)^2 = \frac{14}{28} = \frac{1}{2} \]
\[ \frac{12 \times 3 - 176}{1 - \left(\frac{5}{6}\right)^2} = \frac{5}{11} \neq \frac{1}{2} \quad \text{not a fair bet} \]

8.35 See the solution on the back of the book.