

Self-assessment answers: 22 Probability

1. (a) $P(T_2 = R | T_1 = R) = \frac{11}{27}$

(b) $P(T_1 = T_2) = P(T_1 = T_2 = R) + P(T_1 = T_2 = G) = \frac{12}{28} \times \frac{11}{27} + \frac{16}{28} \times \frac{15}{27} = \frac{31}{63}$

(c) $P(T_2 = T_1 | T_2 = R) = \frac{11}{27}$

[7 marks]

2. (a) 6

(b) $P(R|S) = \frac{P(R \cap S)}{P(S)} = \frac{\frac{6}{85}}{\frac{31}{85}} = \frac{6}{31}$

[7 marks]

3. (a) $P(A \cap B') = P(A|B') \times P(B') = \frac{4}{5} \times \frac{7}{8} = \frac{7}{10}$

$$\Rightarrow P(A \cap B) = P(A) - P(A \cap B') = \frac{4}{5} - \frac{7}{10} = \frac{1}{10}$$

(b) $P(B|A') = \frac{P(B \cap A')}{P(A')} = \frac{P(B) - P(A \cap B)}{P(A')} = \frac{\frac{1}{8} - \frac{1}{10}}{\frac{1}{5}} = \frac{1}{8}$

(c) Yes: $P(A \cap B) = P(A) \times P(B)$

[9 marks]

4. $P(B|L) = \frac{P(B \cap L)}{P(L)} = \frac{\frac{1}{3} \times 0.12}{\frac{1}{3} \times 0.15 + \frac{1}{3} \times 0.08 + \frac{1}{3} \times 0.12} = \frac{12}{35}$

[7 marks]