

Prob [48 marks]

1. [Maximum mark: 5]

Let A and B be events such that $P(A) = 0.5$, $P(B) = 0.4$ and $P(A \cup B) = 0.6$.

Find $P(A|B)$. [5]

2. [Maximum mark: 6]

Two events A and B are such that $P(A) = 0.5$, $P(B) = 0.6$ and $P(A \cap B) = 0.4$.

(a) Find $P(A \cup B)$. [2]

(b) Show that A and B are **not** independent. [1]

(c) Find $P(A|B')$. [3]

3. [Maximum mark: 6]

Events A and B are such that $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A|B) = \frac{1}{4}$.

(a) Find the probability that both events A and B occur. [2]

(b) Find $P(A|B')$. [4]

4. [Maximum mark: 6]

Consider events A and B such that $P(A') = P(A \cup B) = \frac{3}{4}$ and $P(B|A) = \frac{2}{3}$.

(a) Find $P(A \cap B)$. [3]

(b) Show that events A and B are independent. [3]

5. [Maximum mark: 7]

Events A and B are such that $P(A \cup B) = \frac{5}{8}$ and $P(A \cap B') = \frac{7}{24}$.

(a) Find $P(B)$. [3]

(b) Given that events A and B are independent, find $P(A' | B)$. [4]

6. [Maximum mark: 6]

Two events A and B are such that $P(A) = 0.45$, $P(B) = 0.65$ and $P(A \cup B) = 0.8$.

(a) Find $P(A \cap B)$. [3]

(b) Find $P(A' | B')$. [3]

7. [Maximum mark: 6]

Two events A and B are such that $P(A) = 0.65$, $P(B) = 0.45$ and $P(A \cup B) = 0.85$.

(a) Find $P(A \cap B)$. [3]

(b) Find $P(A' | B')$. [3]

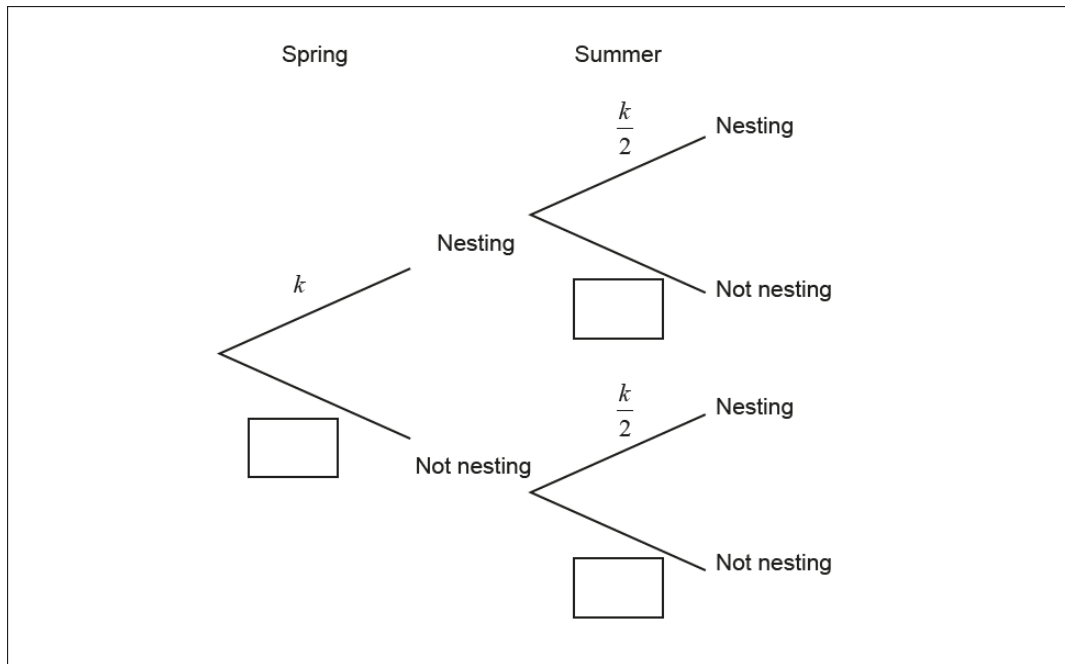
8. [Maximum mark: 6]

A species of bird can nest in two seasons: Spring and Summer.

The probability of nesting in Spring is k .

The probability of nesting in Summer is $\frac{k}{2}$.

This is shown in the following tree diagram.



- (a) Complete the tree diagram to show the probabilities of not nesting in each season. Write your answers in terms of k . [2]

It is known that the probability of not nesting in Spring and not nesting in Summer is $\frac{5}{9}$.

- (b.i) Show that $9k^2 - 27k + 8 = 0$. [3]

- (b.ii) Both $k = \frac{1}{3}$ and $k = \frac{8}{3}$ satisfy $9k^2 - 27k + 8 = 0$.

State why $k = \frac{1}{3}$ is the only valid solution. [1]

