PROBABILITY: VENN DIAGRAMS

AS Unit 2: Applied Mathematics A
Section A: Statistics

WJEC past paper questions: 2010 - 2017

Total marks available 57 (approximately 1 hour 10 minutes)

1. Events A and B are such that
   \[ P(A) = 0.2, \; P(B) = 0.4, \; P(A \cup B) = 0.52. \]
   a) Show that A and B are independent. \( (5) \)
   b) Calculate the probability of exactly one of the two events occurring. \( (2) \)

(January 10)

2. The independent events A and B are such that
   \[ P(A) = 0.6, \; P(B) = 0.3. \]
   Find the value of
   a) \( P(A \cup B) \), \( (3) \)
   b) \( P(A \cup B') \). \( (3) \)

(Summer 10)

3. The events A and B are such that
   \[ P(A) = 0.25, \; P(B) = 0.4, \; P(A' \cap B') = 0.45. \]
   Determine whether
   a) A and B are mutually exclusive, \( (3) \)
   b) A and B are independent. \( (4) \)

(Summer 11)

4. The events A and B are such that
   \[ P(A) = 0.5, \; P(B) = 0.3. \]
   a) Evaluate \( P(A \cup B) \) when
      i) A, B are mutually exclusive, \( (5) \)
      ii) A, B are independent.

(Summer 12)

5. The independent events A, B are such that
   \[ P(A) = 0.2, \; P(A \cup B) = 0.4. \]
   a) Determine the value of \( P(B) \). \( (4) \)
   b) Calculate the probability that exactly one of the events A, B occurs. \( (3) \)

(January 13)
6. The events A and B are such that
\[ P(A) = 0.25, \ P(A \cup B) = 0.4. \]
Evaluate \( P(B) \) when
a) A, B are mutually exclusive, \hspace{1cm} (2)
b) A, B are independent. \hspace{1cm} (3)

(Summer 13)

7. The events A and B are such that
\[ P(A) = 0.3, \ P(B) = 0.4, \ P(A \cup B) = 0.5. \]
Determine whether or not A and B are independent. \hspace{1cm} (3)

(Summer 14)

8. The events A and B are such that
\[ P(A) = 0.3, \ P(B) = 0.4. \]
Evaluate \( P(A \cup B) \) in each of the following cases.
a) A and B are mutually exclusive. \hspace{1cm} (2)
b) A and B are independent. \hspace{1cm} (3)

(Summer 16)

9. The events A and B are such that
\[ P(A) = 0.2, \ P(B) = 0.3, \ P(A \cup B) = 0.4. \]
a) Show that A and B are not independent. \hspace{1cm} (3)
b) Determine the value of \( P(A \cup B') \). \hspace{1cm} (3)

(Summer 17)

10. The events A, B are such that
\[ P(A) = 0.2, \ P(B) = 0.3. \]
Determine the value of \( P(A \cup B) \) when
a) A, B are mutually exclusive. \hspace{1cm} (2)
b) A, B are independent. \hspace{1cm} (3)
c) \( A \subset B \). \hspace{1cm} (1)

(Sample Paper)

(NB: Some of these questions have parts omitted from their originals. This is because the specification has changed and conditional probability is no longer examined at AS.)