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Venn Diagrams

(Gaeaf 2005)

4. The events A and B are such that

$$P(A) = 0.2, P(B) = 0.6 \text{ and } P(A | B) = 0.3.$$

Find

(a) $P(A \cap B)$, [2]

(b) $P(B | A)$, [3]

(c) $P(A \cup B)$. [3]

(d) $P(A' \cap B')$. [2]

(Haf 2005)

2. A tennis club has 150 members in the following categories.

	Junior	Senior	Social
Male	20	30	30
Female	15	20	35

A new tennis court has been built and it is decided to select one of the members at random to perform the opening ceremony. Let A denote the event that the selected member is male and let B denote the event that the selected member is a junior.

- (a) Evaluate

(i) $P(A)$,

(ii) $P(B | A)$,

(iii) $P(A \cup B)$. [6]

- (b) Determine whether or not A and B are independent. [3]

(Gaeaf 2006)

2. The events A and B are such that $P(A) = 0.5$ and $P(A \cup B) = 0.7$. Determine the value of $P(B)$ in each of the cases when

(a) A and B are mutually exclusive, [2]

(b) A and B are independent, [4]

(c) $P(B | A) = 0.3$. [3]

(Haf 2006)

2. The events A and B are such that

$$P(A) = 0.2, P(B) = 0.6, P(A \cup B) = 0.75.$$

- (a) Determine whether or not A and B are independent. [4]
(b) Find the probability that exactly one of A and B occurs. [4]

(Gaeaf 2007)

2. The events A and B are such that

$$P(A) = 0.48, P(B) = 0.38, P(A \cap B) = 0.28.$$

Calculate

- (a) $P(A \cup B)$, [2]
(b) $P(A' \cap B')$, [2]
(c) $P(B | A')$. [4]

(Haf 2007)

1. The independent events A, B are such that

$$P(A) = 0.6, P(B) = 0.3.$$

Find

- (a) $P(A \cup B)$, [4]
(b) the probability that neither A nor B occurs, [3]
(c) $P(A | A \cup B)$. [3]

(Gaeaf 2008)

1. The two events A, B are such that

$$P(A) = 0.3, P(B) = 0.1, P(A \cup B) = 0.35.$$

- (a) Evaluate $P(A \cap B)$. [2]
(b) Determine whether or not A and B are independent. [3]
(c) Evaluate $P(A | B')$. [4]

(Haf 2008)

2. The two independent events A and B are such that

$$P(A) = 0.2, P(A \cup B) = 0.4.$$

- (a) Evaluate $P(B)$. [4]
- (b) Find the probability that exactly one of the two events occurs. [3]
- (c) Given that exactly one of the two events occurs, calculate the probability that A occurs. [3]

(Gaeaf 2009)

1. The two events A, B are such that

$$P(A) = 0.65, P(A \cup B) = 0.93.$$

Evaluate $P(B)$ given that

- (a) A and B are mutually exclusive, [2]
- (b) A and B are independent. [4]
2. In a class of 30 students, 12 are studying French, 15 are studying Spanish and 8 are studying neither French nor Spanish. A student is selected at random from this class.
- (a) Find the probability that the student is studying both French and Spanish. [4]
- (b) Find the probability that the student is studying French but not Spanish. [2]

(Haf 2009)

2. Events A and B are such that

$$P(A) = 0.2, P(B) = 0.3.$$

- (a) Evaluate $P(A \cup B)$ when
- (i) A and B are mutually exclusive,
- (ii) A and B are independent. [5]
- (b) Given that $P(A \cup B) = 0.4$, calculate $P(A|B)$. [4]
- (c) What is the smallest possible value for $P(A \cup B)$ and when does this occur? [2]

(Gaeaf 2010)

2. Events A and B are such that

$$P(A) = 0.2, \quad P(B) = 0.4, \quad P(A \cup B) = 0.52.$$

- (a) Show that A and B are independent. [5]
- (b) Calculate the probability of exactly one of the two events occurring. [2]
- (c) Given that exactly one of the two events occurs, calculate the probability that A occurs. [3]

(Haf 2010)

1. The independent events A and B are such that

$$P(A) = 0.6, \quad P(B) = 0.3.$$

Find the value of

- (a) $P(A \cup B)$, [3]
- (b) $P(A \cup B')$. [3]

(Gaeaf 2011)

2. The events A and B are such that

$$P(A) = P(B) = p \text{ and } P(A \cup B) = 0.64.$$

- (a) Given that A and B are mutually exclusive, find the value of p . [2]
- (b) Given, instead, that A and B are independent, show that

$$25p^2 - 50p + k = 0,$$

where k is a constant whose value should be found.

Hence find the value of p . [5]

(Haf 2011)

3. The events A and B are such that

$$P(A) = 0.25, \quad P(B) = 0.4 \text{ and } P(A' \cap B') = 0.45.$$

Determine whether

- (a) A and B are mutually exclusive, [3]
- (b) A and B are independent. [4]

(Gaeaf 2012)

4. The events A and B are such that

$$P(A) = 0.4, P(B) = 0.2 \text{ and } P(A|B) = 0.3.$$

Calculate

(a) $P(A \cap B)$, [2]

(b) $P(A \cup B)$, [2]

(c) $P(B|A)$. [2]

(Haf 2012)

1. 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.

- (b) Given that $P(A \cup B) = 0.7$, find the value of $P(B|A)$. [3]

(Gaeaf 2013)

1. 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]

(Haf 2013)

1. 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, [2]

- (b) A, B are independent. [3]

(Gaeaf 2014)

1. The events A and B are such that

$$P(A) = 0.5, P(B) = 0.2, P(A|B) = 0.4.$$

(a) Calculate

(i) $P(A \cap B)$,

(ii) $P(B|A)$.

[4]

(b) Giving a reason, state whether or not A and B are mutually exclusive.

[1]

(Haf 2014)

1. The events A and B are such that

$$P(A) = 0.3, P(B) = 0.4, P(A \cup B) = 0.5.$$

(a) Determine whether or not A and B are independent.

[3]

(b) Evaluate $P(A|B')$.

[3]

(Haf 2015)

2. The events A and B are such that

$$P(A) = 0.4, P(B) = 0.5 \text{ and } P(A \cup B) = 2 \times P(A \cap B).$$

(a) Show that $P(A \cap B) = 0.3$.

[2]

(b) Evaluate $P(A|B)$.

[2]

(c) Evaluate $P(B|A')$.

[3]

(Haf 2016)

1. 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.

[2]

(b) A and B are independent.

[3]

(c) $P(A|B) = 0.25$.

[4]

(Haf 2017)

1. 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. [3]

(b) Determine the value of

(i) $P(A'|B)$,

(ii) $P(A \cup B')$. [6]

(Haf 2018)

2. The independent events A and B are such that

$$P(A \cup B) = 0.9, P(A \cap B) = 0.4, P(A) > P(B).$$

(a) Determine the values of $P(A)$ and $P(B)$. [7]

(b) Determine the value of $P(A|A \cup B)$. [3]