Probability - 1

Exercise A

1.

A and B are two events and $P(A) = 0.5$, $P(B) = 0.2$ and $P(A \cap B) = 0.1$.
Find

a $P(A \cup B)$,   **b** $P(B')$,

c $P(A \cap B')$,   **d** $P(A \cup B')$.

2.

A and C are two events and $P(A) = 0.4$, $P(B) = 0.5$ and $P(A \cup B) = 0.6$.
Find

a $P(A \cap B)$,   **b** $P(A')$,

c $P(A \cup B')$,   **d** $P(A' \cup B)$.

3.

If A and B are two events and $P(A) = 0.6$, $P(B) = 0.3$ and
$P(A \cup B) = 0.8$, find:

(a) $P(A \cap B)$ (b) $P(A' \cap B)$ (c) $P(A \cap B')$

(d) $P(A' \cap B')$ (e) $P(A \cup B')$ (f) $P(A' \cup B)$.

4.

If S and T are two events and $P(T) = 0.4$, $P(S \cap T) = 0.15$
and $P(S' \cap T') = 0.5$, find:

(a) $P(S \cap T')$ (b) $P(S)$ (c) $P(S \cup T)$

(d) $P(S' \cap T)$ (e) $P(S' \cup T')$.

5.

C and D are two events and $P(D) = 0.4$, $P(C \cap D) = 0.15$ and $P(C' \cap D') = 0.1$.
Find

a $P(C' \cap D)$,   **b** $P(C \cap D')$,

c $P(C)$,   **d** $P(C' \cap D')$.

6.

There are two events T and Q where $P(T) = P(Q) = 3P(T \cap Q)$ and $P(T \cup Q) = 0.75$.
Find

a $P(T \cap Q)$,   **b** $P(T)$,   **c** $P(Q')$,

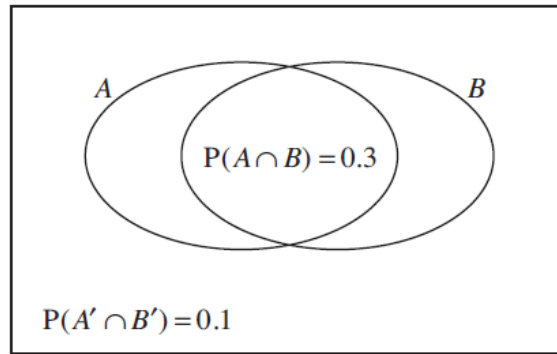**d** $P(T' \cap Q')$,   **e** $P(T \cap Q')$.

7.

The events M and N are such that $P(M) = P(N) = 2P(M \cap N)$.
Given that $P(M \cup N) = 0.6$, find:

(a) $P(M \cap N)$ (b) $P(M)$ (c) $P(M' \cap N')$

(d) $P(M \cap N')$.

8.

The Venn diagram illustrates the occurrence of two events A and B.

You are given that $P(A \cap B) = 0.3$ and that the probability that neither A nor B occurs is 0.1. You are also given that $P(A) = 2P(B)$.

Find $P(B)$. [3]

9.

A survey of all the households in the town of Bury was carried out. The survey showed that 70% have a freezer and 20% have a dishwasher and 80% have either a dishwasher or a freezer or both appliances. Find the probability that a randomly chosen household in Bury has both appliances.

10.

The probability that a child in a school has blue eyes is 0.27 and the probability they have blonde hair is 0.35. The probability that the child will have blonde hair or blue eyes or both is 0.45. A child is chosen at random from the school. Find the probability that the child has

a blonde hair and blue eyes,

b blonde hair but not blue eyes,

c neither feature.

11.

A patient going in to a doctor's waiting room reads *Hiya* Magazine with probability 0.6 and *Dakor* Magazine with probability 0.4. The probability that the patient reads either one or both of the magazines is 0.7. Find the probability that the patient reads
a both magazines, b *Hiya* Magazine only.