Jan 04

**4.** The events $A$ and $B$ are such that $P(A) = \frac{2}{5}$, $P(B) = \frac{1}{2}$ and $P(A \mid B') = \frac{4}{5}$.

(*a*) Find

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

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

(iii) $P(A \cup B)$,

(iv) $P(A \mid B)$.

**(7)**

(*b*) State, with a reason, whether or not $A$ and $B$ are

(i) mutually exclusive,

**(2)**

(ii) independent.

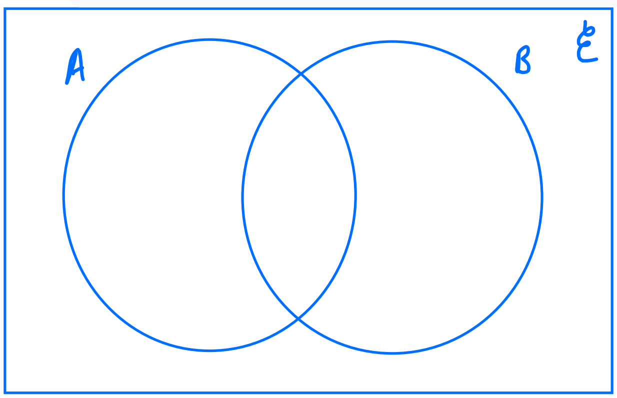
**(2)**

Independence

$P(C) \times P(D) = P(C \cap D)$

Conditional Probability

$P(C \mid D) = \dfrac{P(C \cap D)}{P(D)}$



Jan 06

**6.** For the events $A$ and $B$,

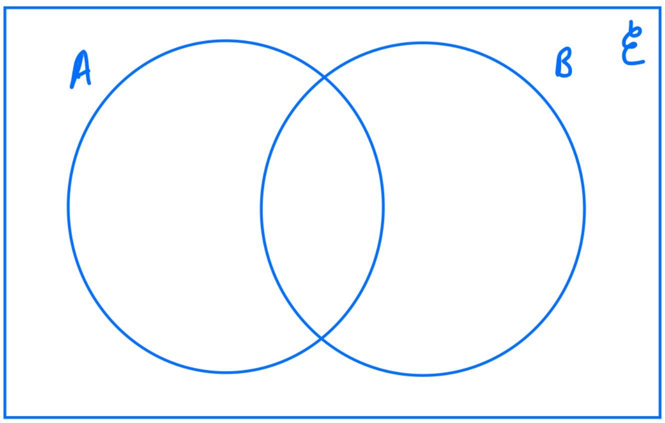
$$P(A \cap B') = 0.32,\ P(A' \cap B) = 0.11 \text{ and } P(A \cup B) = 0.65.$$

(*a*) Draw a Venn diagram to illustrate the complete sample space for the events $A$ and $B$.
**(3)**

(*b*) Write down the value of P($A$) and the value of P($B$).
**(3)**

(*c*) Find $P(A \mid B')$.
**(2)**

(*d*) Determine whether or not $A$ and $B$ are independent.
**(3)**



May 02

**3.** For the events $A$ and $B$,

($a$) explain in words the meaning of the term $\mathrm{P}(B \mid A)$,

**(2)**

($b$) sketch a Venn diagram to illustrate the relationship $\mathrm{P}(B \mid A) = 0$.

**(2)**

Three companies operate a bus service along a busy main road. Amber buses run 50% of the service and 2% of their buses are more than 5 minutes late. Blunder buses run 30% of the service and 10% of their buses are more than 5 minutes late. Clipper buses run the remainder of the service and only 1% of their buses run more than 5 minutes late.

Jean is waiting for a bus on the main road.

($c$) Find the probability that the first bus to arrive is an Amber bus that is more than 5 minutes late. **(2)**

Let $A$, $B$ and $C$ denote the events that Jean catches an Amber bus, a Blunder bus and a Clipper bus respectively. Let $L$ denote the event that Jean catches a bus that is more than 5 minutes late.

($d$) Draw a Venn diagram to represent the events $A$, $B$, C and $L$. Calculate the probabilities associated with each region and write them in the appropriate places on the Venn diagram.

**(4)**

($e$) Find the probability that Jean catches a bus that is more than 5 minutes late.

**(2)**