

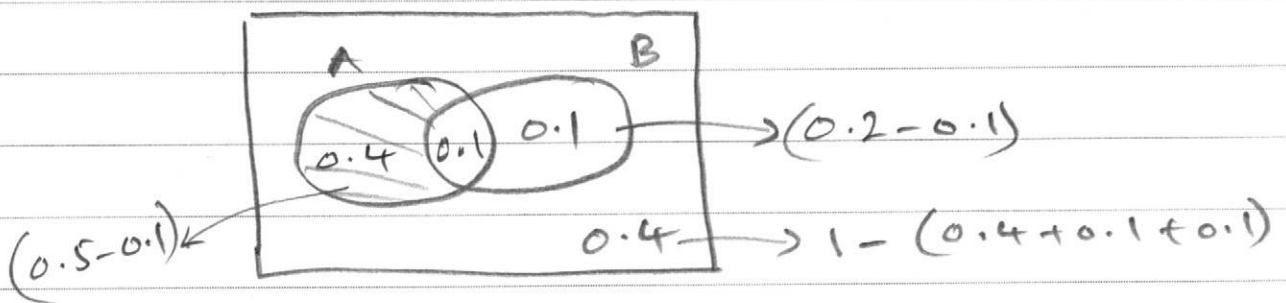
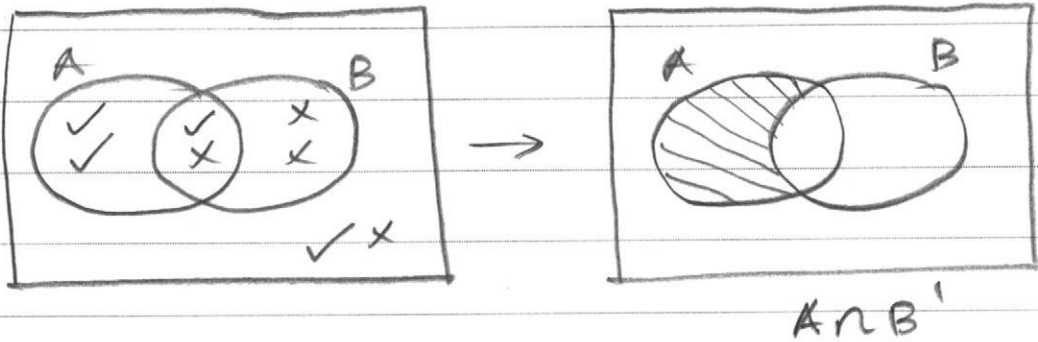
Probability - Exercise B - Answers

①

$$\begin{aligned}
 (a) \quad P(A \cup B) &= P(A) + P(B) - P(A \cap B) \\
 &= 0.5 + 0.2 - 0.1 \\
 &= \underline{\underline{0.6}}
 \end{aligned}$$

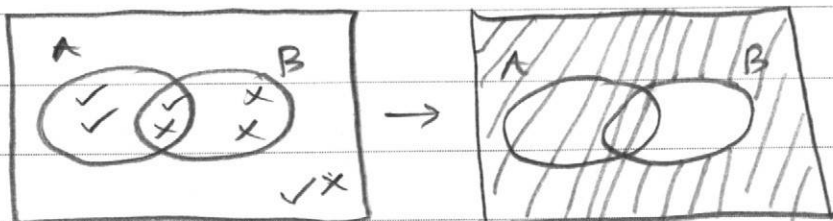
$$\begin{aligned}
 (b) \quad P(B') &= 1 - P(B) \\
 &= 1 - 0.2 \\
 &= \underline{\underline{0.8}}
 \end{aligned}$$

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



$$\therefore P(A \cap B') = \underline{\underline{0.4}}$$

(d) $P(A \cup B')$



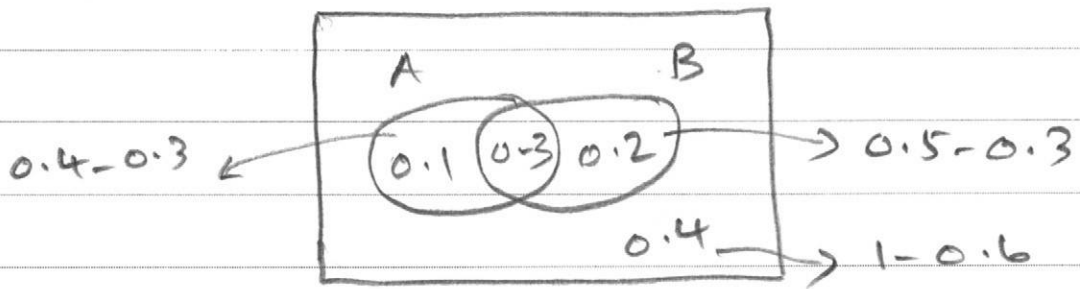
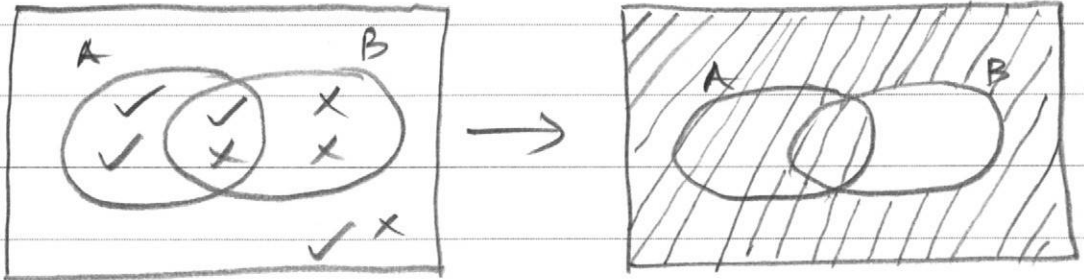
$$P(A \cup B') = 1 - 0.1 = 0.9 //$$

2

(a) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$
 $0.6 = 0.4 + 0.5 - P(A \cap B)$
 $P(A \cap B) = \underline{\underline{0.3}}$

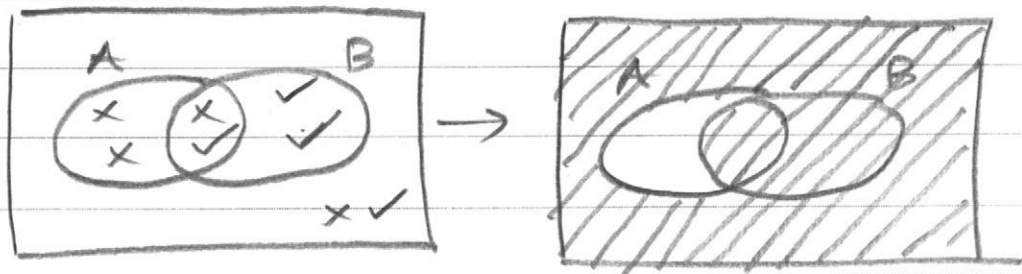
(b) $P(A') = 1 - P(A)$
 $= 1 - 0.4$
 $= \underline{\underline{0.6}}$

(c) $P(A \cup B')$



$\therefore P(A \cup B') = 1 - 0.2$
 $= \underline{\underline{0.8}}$

(d) $P(A' \cup B)$



$P(A' \cup B) = 1 - 0.1 = 0.9 //$

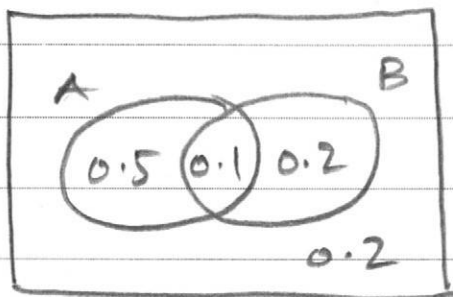
3

(a) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

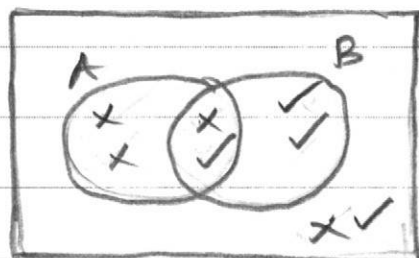
$0.8 = 0.6 + 0.3 - P(A \cap B)$

$P(A \cap B) = \underline{\underline{0.1}}$

(b)



$A' \cap B$

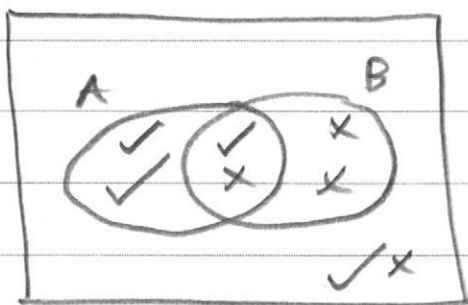


$A' \cap B$

→ All ticks.

$\therefore P(A' \cap B) = \underline{\underline{0.2}}$

(c) $A \cap B'$

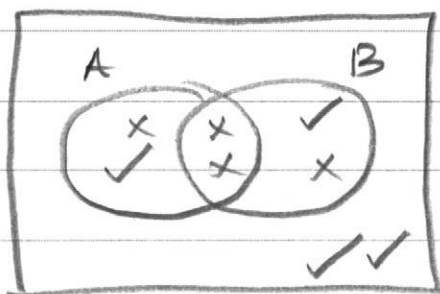


$A \cap B'$

→ All ticks

$\therefore P(A \cap B') = \underline{\underline{0.5}}$

(d) $A' \cap B'$



$P(A' \cap B') = \underline{\underline{0.2}}$

(e) $A \cup B'$

Refer to the diagram in part (c).

$A \cup B'$

↳ At least one tick.

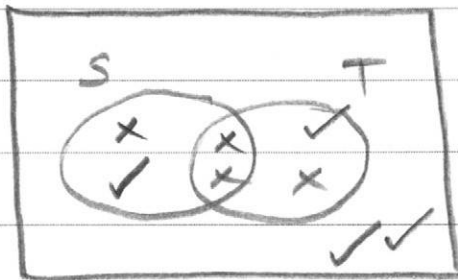
$$\begin{aligned} \therefore P(A \cup B') &= 1 - 0.2 \\ &= \underline{\underline{0.8}} \end{aligned}$$

(f) $A' \cup B$

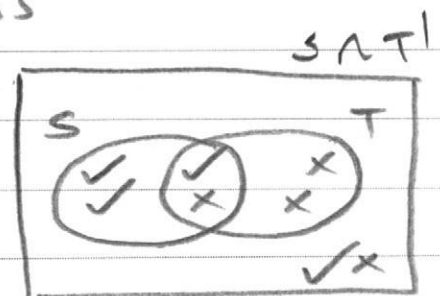
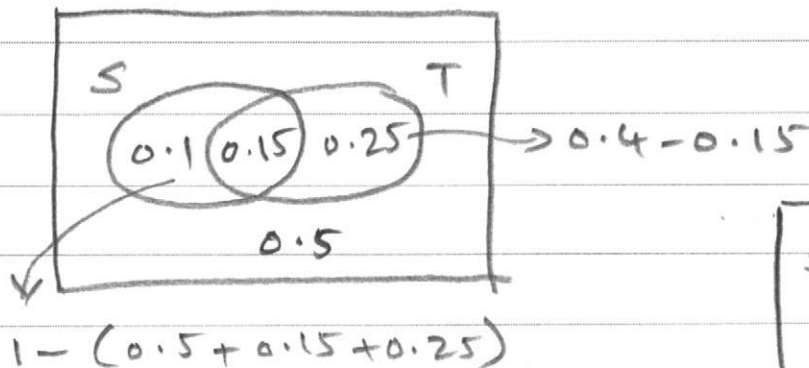
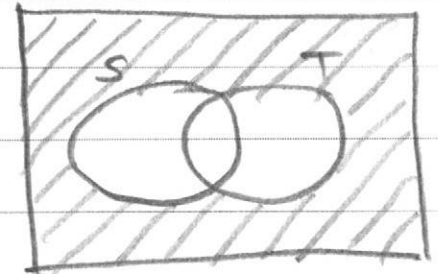
Refer to the diagram in part (b).

$$\begin{aligned} P(A' \cup B) &= 1 - 0.5 \\ &= \underline{\underline{0.5}} \end{aligned}$$

(4) (a)



$S' \cap T'$

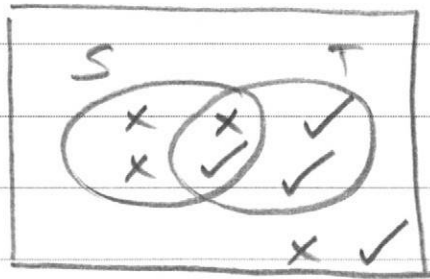


$$\therefore P(S \cap T) = \underline{\underline{0.1}}$$

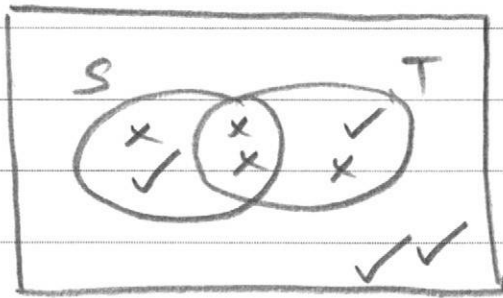
$$(b) \quad P(S) = 0.1 + 0.15 \\ = \underline{\underline{0.25}}$$

$$(c) \quad P(S \cup T) = 0.1 + 0.15 + 0.25 \\ = \underline{\underline{0.5}}$$

$$(d) \quad P(S' \cap T) \\ = \underline{\underline{0.25}}$$



(e)



$$P(S' \cup T') = 1 - 0.15 \\ = \underline{\underline{0.85}}$$

5

$$(a) \quad P(C' \cap D) = 0.25$$

$$(b) \quad P(C \cap D') = 0.5$$

$$(c) \quad P(C) = 0.65$$

$$(d) \quad P(C' \cap D') = 0.1$$

⑥

$$\text{Let } P(T \cap Q) = x.$$

$$\therefore P(T) = P(Q) = 3x$$

$$(a) \quad P(T \cup Q) = P(T) + P(Q) - P(T \cap Q)$$

$$0.75 = 3x + 3x - x$$

$$x = 0.15$$

$$\therefore P(T \cap Q) = \underline{\underline{0.15}}$$

$$(b) \quad P(T) = 0.45$$

$$(c) \quad P(Q') = 0.55$$

$$(d) \quad P(T' \cap Q') = 0.25$$

$$(e) \quad P(T \cap Q') = 0.3$$

⑦

$$\text{Let } P(M \cap N) = x.$$

$$\therefore P(M) = P(N) = 2x$$

$$(a) \quad P(M \cup N) = P(M) + P(N) - P(M \cap N)$$

$$0.6 = 2x + 2x - x$$

$$x = 0.2$$

$$\therefore P(M \cap N) = \underline{\underline{0.2}}$$

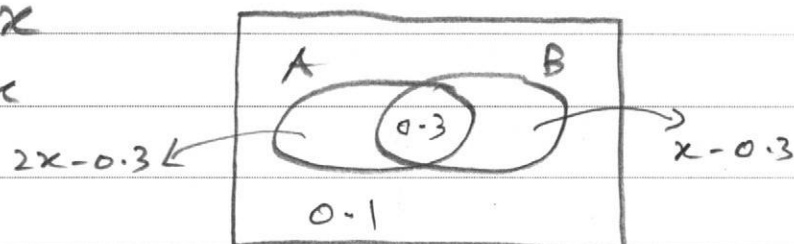
$$(b) \quad P(M) = 0.4$$

$$(c) P(M' \cap N') = 0.4$$

$$(d) P(M \cap N') = 0.2$$

$$(8) \text{ Let } P(B) = x$$

$$\therefore P(A) = 2x$$



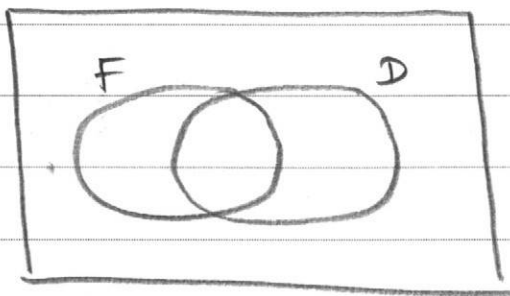
$$(2x - 0.3) + 0.3 + (x - 0.3) + 0.1 = 1$$

$$3x - 0.2 = 1$$

$$x = 0.4$$

$$\therefore P(B) = \underline{\underline{0.4}}$$

(9)



$$P(F) = 0.7$$

$$P(D) = 0.2$$

$$P(F \cup D) = 0.8$$

$$P(F \cup D) = P(F) + P(D) - P(F \cap D)$$

$$0.8 = 0.7 + 0.2 - P(F \cap D)$$

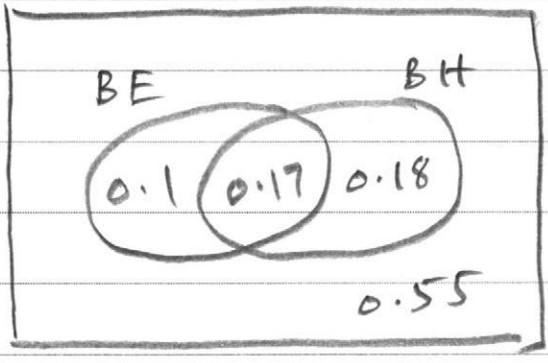
$$P(F \cap D) = \underline{\underline{0.1}}$$

10

$P(BE) = 0.27, P(BH) = 0.35, P(BE \cup BH) = 0.45$

(a) $P(BE \cup BH) = P(BE) + P(BH) - P(BE \cap BH)$
 $0.45 = 0.27 + 0.35 - P(BE \cap BH)$
 $\therefore P(BE \cap BH) = \underline{\underline{0.17}}$

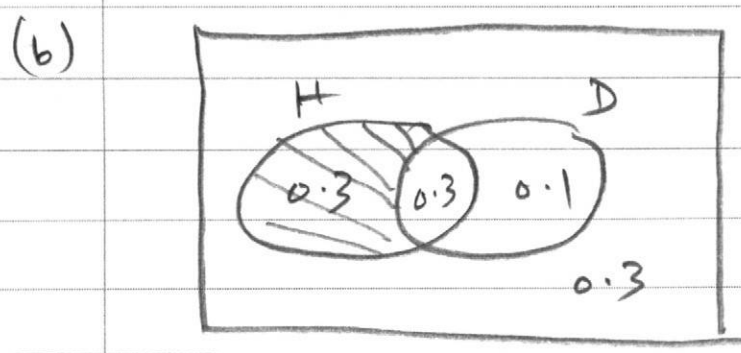
(b) $P(BH \cap BE')$
 $= \underline{\underline{0.18}}$



(c) $P(BH' \cup BE') = \underline{\underline{0.55}}$

11 $P(H) = 0.6, P(D) = 0.4, P(H \cup D) = 0.7$

(a) $P(H \cup D) = P(H) + P(D) - P(H \cap D)$
 $0.7 = 0.6 + 0.4 - P(H \cap D)$
 $\therefore P(H \cap D) = 0.3 //$



$P(H \text{ only}) = \underline{\underline{0.3}}$