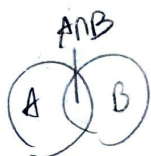HW2

2.66.

(a). 表中已標示了這些事件各占
的%數（總和為100%），故
可直接使用。

$2\% + 32\% = 32\%$

(b). $32\% + 25\% + 30\% = 87\%$

(c). $5\% + 6\% + 2\% = 13\%$

(d). $6\% + 25\% + 2\% + 30\% = 63\%$

2.82.

設A為丈夫投、B為妻子投

$P(A) = 0.2$, $P(B) = 0.28$, $P(A \cap B) = 0.15$

(a). $P(A \cup B) = P(A) + P(B) - P(A \cap B) = 0.33$

(b). $\dfrac{P(A \cap B)}{P(A)} = \dfrac{0.15}{0.2} = \dfrac{3}{4}$

(c). $\dfrac{P(A \cap B')}{P(B')} = \dfrac{0.05}{0.72} = 0.07$

2.90

$P(A) = 0.30$, $P(B|A) = 0.75 \Rightarrow P(A \cap B) = 0.75 \times 0.3 = 0.225$

(a). $P(C|A \cap B) = 0.20 \Rightarrow P(A \cap B \cap C) = 0.225 \times 0.2 = 0.045$

$P(B|A') = 0.20 = \dfrac{P(B \cap A')}{P(A')} = \dfrac{P(B \cap A')}{0.7} \Rightarrow P(B \cap A') = 0.14$

$\Rightarrow P(B) = P(A \cap B) + P(B \cap A') = 0.365$

$P(A' \cap B \cap C) = P(C|A' \cap B) \times P(A' \cap B) = 0.15 \times 0.14 = 0.021$

$P(A \cap B') = P(A) - P(A \cap B) = 0.075$

$P(C \cap A \cap B') = P(C|A \cap B') \times P(A \cap B') = 0.80 \times 0.075 = 0.06$

$P(C \cap A' \cap B') = P(C|A' \cap B') \times P(A' \cap B') = 0.90 \times (1 - P(A \cup B))$

$= 0.9 \times [1 - (0.3 + 0.14)] = 0.504$

(b). $P(B' \cap C) =$
$P(A \cap B' \cap C) + P(A' \cap B' \cap C)$
$= 0.564$

(c).
$P(C) = P(A \cap B \cap C) + P(A' \cap B \cap C)$
$\quad + P(A \cap B' \cap C) + P(A' \cap B' \cap C)$
$= 0.045 + 0.021 + 0.06 + 0.504$
$= 0.63$

(d). $P(A | B' \cap C)$

$= \dfrac{P(A \cap B' \cap C)}{P(B' \cap C)}$

$= \dfrac{0.06}{0.564} = 0.106$ #

2.100

$\dfrac{5}{7 + 7 + 5} = 0.263$

2.126.

(a). $\dfrac{13}{13 + 10} = 0.565$

(b). $\dfrac{2}{40 + 13 + 4 + 2} = 0.034$

Matlab

(b).直方圖。X 軸為重複 1000 次後，B1 生產 10000 個產品會有的不良產品數量。Y 軸則為相對頻率。可以看出整體還算平均，但高峰有往中間集中的趨勢。我將偏差設為 2.5%，所以雖然 B1 的不良率是 2%，但實際上會在 1.95%~2.05%間遊蕩，也才會有下圖各種 X 軸數值。

Number of Defective Products Out of 10000 Made by B1 for 1000 Times