

Tut 8.

1. (a) $P(B) = 0.6$

(b) $P(A^c \cap B) = 0.5$

(c) $P(A \cup B) = 0.8$

(d) $P(A^c | B) = \frac{P(A^c \cap B)}{P(B)} = \frac{0.5}{0.6} = \frac{5}{6}$

(e) $P(B | A^c) = \frac{P(B \cap A^c)}{P(A^c)} = \frac{0.5}{0.7} = \frac{5}{7}$

2. (a) i $c = 0$

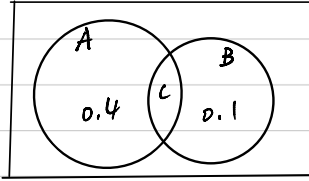
ii $P(A \cap B) = P(A) \times P(B)$

$\downarrow \quad \quad \downarrow \quad \quad \downarrow$
 $c \quad 0.4+c \quad 0.1+c$

$c = (0.4+c)(0.1+c)$

\downarrow

$(c-0.1)(c-0.4) = 0 \Rightarrow c = 0.1$
or
 $c = 0.4$



(b) i When $c = 0$

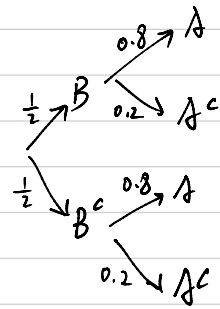
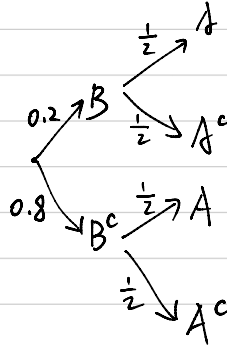
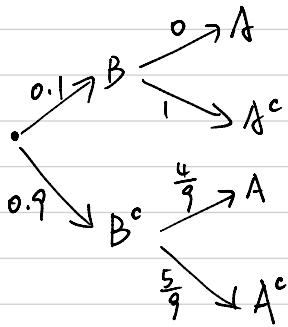
	B	B ^c	Total
A	0	0.4	0.4
A ^c	0.1	0.5	0.6
Total	0.1	0.9	1

when $c = 0.1$

	B	B ^c	Total
A	0.1	0.4	0.5
A ^c	0.1	0.4	0.5
Total	0.2	0.8	1

When $c = 0.4$

	B	B ^c	Total
A	0.4	0.4	0.8
A ^c	0.1	0.1	0.2
Total	0.5	0.5	1



3. (a) $M \rightarrow P(M) = \frac{1}{50} = 0.02$

$T \rightarrow P(T) = \frac{1}{5} = 0.2$

$M \cap T$

$P(M \cap T) = \frac{1}{100} = 0.01$

	T	T ^c	Total
M	0.01	0.01	0.02
M ^c	0.19	0.79	0.98
Total	0.2	0.8	1

$P(M \cup T) = P(M) + P(T) - P(M \cap T) = 0.21$

$P(M^c \cap T^c) = 1 - 0.21 = 0.79$

See at least one: 0.21

See none: 0.79.

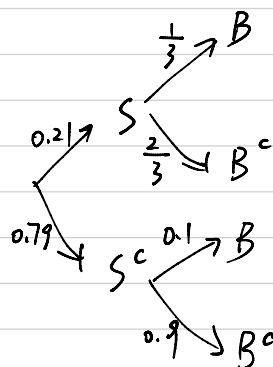
(b). $B \rightarrow \text{Buy} \quad P(B|S) = \frac{1}{3}$

$S \rightarrow \text{Seen} \quad P(S) = 0.21$

$P(B|S^c) = 0.1 \quad P(S^c) = 0.79$

$P(B) = P(B|S)P(S) + P(B|S^c)P(S^c)$

$= 0.149$



$P(B) = \frac{1}{3} \times 0.21 + 0.1 \times 0.79$
 $= 0.149$