Tutorial Preparation Week 9

3. (a)

(i) $P(B) = 1 - P(\bar{B}) = 1 - 0.6 = 0.4.$

$P(A \cap B) = 0.2$ ~~$= P(A) \times P(A|B) = P(A)$~~

$P(A \cup B) = 0.4$

$P(A|B) = \cancel{P(A)} \quad \frac{P(A \cap B)}{P(B)} = \frac{0.2}{0.4} = \frac{1}{2}.$

$P(B|A) = \frac{P(B \cap A)}{P(A)} = \frac{0.2}{0.2} = 1$

(ii) $P(A \cap \bar{B}) = 0$?

$P(A \cap \bar{B}) = 0.2 \neq 0 \rightarrow$ NOT disjoint.

(iii) $P(A \cap \bar{B}) = P(A) \cdot P(\bar{B})$?

$0.2 = 0.2 \cdot 0.4$

$0.2 \neq 0.08 \rightarrow$ NOT ~~re~~ independent