The Chinese University of Hong Kong
Department of Mathematics

MMAT 5140 Probability Theory 2015 - 2016
Suggested Solution to Homework 4

1. P. 96, Q2

$$P(\text{is a A student}) = (0.6)(0.16) + (0.4)(0.2) = 0.096 + 0.08 = 0.176.$$

2. P. 96, Q9

$$P(\text{is defective}) = (0.5)(0.04) + (0.3)(0.02) + (0.2)(0.04) = 0.034.$$

3. P. 105, Q3    Denote $G, N, L$ be the events the suspect is guilty, the suspect is not guilty and the suspect is left-handed respectively. By the Bayes' Formula,

$$
\begin{aligned}
P(\text{G}|\text{L}) & \\
&= \frac{P(\text{L}|\text{G})P(\text{G})}{P(\text{L}|\text{G})P(\text{G}) + P(\text{L}|\text{N})P(\text{N})} \\
&= \frac{(0.85)(0.65)}{(0.85)(0.65) + (0.23)(0.35)} \\
&\approx 0.872
\end{aligned}
$$