



Q	Answer	Marks
1	a) 0.15 b) $3/7$ (0.429) c) $P(A)P(B) = 0.14 \neq 0.15 = P(A \cap B)$, so A and B are not independent	4
2	a) $29/100$ (0.29) b) $20/31$ (0.645) c) $19/45$ (0.422) d) $P(W)P(T) = 0.29 \times 0.45 = 0.1305 \neq 0.15 = P(W \cap T)$, so not independent	5
3	a) A only 0.27, $A \cap B$ 0.18, B only 0.30, outside 0.25 b) 0.375 c) $P(A)P(B) = 0.45 \times 0.48 = 0.216 \neq 0.18 = P(A \cap B)$, so not independent	6
4	a) 0.6 b) 0.7 c) 0.1	6
5	a) A and C b) $q = 0.1$ c) $p = 0.22$, $r = 0.33$ d) 0.2 e) $8/45$ (0.178)	8
6	a) 0.6 b) 0.75 c) 0.625	6
7	a) 0.3 b) X: red 0.6, blue 0.4; Y: red 0.7, blue 0.3 on both branches c) 0.46 d) $9/23$ (0.391)	7
8	a) $P(A) = 0.4$, $P(B) = 0.3$ b) 0.6 c) $P(A \cap B') = P(A) - P(A \cap B) = P(A) - P(A)P(B) = P(A)(1 - P(B)) = P(A)P(B')$, so A and B' are independent	7
9	a) 0.18 b) J only 0.024, S only 0.07, T only 0.32, $J \cap S$ only 0.036, $J \cap T$ only 0.096, $S \cap T$ only 0.12, $J \cap S \cap T$ 0.144, outside 0.19 c) $33/85$ (0.388) d) $18/37$ (0.486) e) 0.214	9
10	a) 0.1775 b) 0.761 c) 0.364 d) only about 76% of the emails labelled spam are actually spam, so about 1 in 4 is a genuine email wrongly labelled	7
11	a) $6/11$ (0.545) b) $x = 0.15$, $y = 0.15$ c) $2/3$ d) $B \cap A'$	8
12	a) $0.3d / (0.02 + 0.3d) = 0.36$ gives $d = 0.0375$, so $k = 3.75$ b) 0.03125 c) 0.129 d) 0.32	9

Full worked solutions, written out by hand, are on the solutions sheet for this topic.