Answer Key 1

1. 생략

2.

(1) $\mathrm{P(R)} = 0.67, \mathrm{P(R \cup S)} = 0.55.$

$\mathrm{P(R \cup S)} = \mathrm{P(R)} + \mathrm{P(S)} - \mathrm{P(R \cap S)} \geq \mathrm{P(R)}$ should hold.

(2) $\mathrm{P(E)} = 0.82, \mathrm{P(E \cap F)} = 0.86.$

$P(E) \geq P(E \cap F)$ should hold.

(3) $\mathrm{P(G)} = 0.72, \mathrm{P(B)} = 0.84, \mathrm{P(G \cap B)} = 0.52.$

$P(G \cup B) = P(G) + P(B) - P(G \cap B) = 1.04 > 1$ violates the axiom of probability.

3. $\mathrm{P(A)} = 0.5, \mathrm{P(B)} = 0.7,$

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

Since $\mathrm{P(A \cup B)} \leq 1$ and $P(A \cap B) \leq \min\{P(A),\ P(B)\},\ 0.2 \leq P(A \cap B) \leq 0.5$

4. $\mathrm{P(A)} = \frac{18}{36} = \frac{1}{2}, \mathrm{P(B)} = \frac{18}{36} = \frac{1}{2},\ \mathrm{P(C)} = \frac{6}{36} = \frac{1}{6},$

$$\mathrm{P(A \cap B)} = \frac{9}{36} = \frac{1}{4}, \mathrm{P(B \cap C)} = \frac{3}{36} = \frac{1}{12}, \mathrm{P(B \cap C)} = \frac{3}{36} = \frac{1}{12}$$

$\Rightarrow$ $\mathrm{P(A \cap B)} = \frac{1}{4} = \mathrm{P(A)P(B)}$; A and B are independent.

$\mathrm{P(B \cap C)} = \frac{1}{4} = \mathrm{P(B)P(C)}$; B and C are independent.

$\mathrm{P(A \cap C)} = \frac{1}{4} = \mathrm{P(A)P(C)}$; A and C are independent.

5. $\mathrm{P(A)} = 0.7, \mathrm{P(B)} = 0.5, \mathrm{P}(\overline{\mathrm{A \cup B}}) = 0.1$

$\Rightarrow$ $\mathrm{P(A \cup B)} = 1 - \mathrm{P}(\overline{\mathrm{A \cup B}}) = 0.3$

(1) $\mathrm{P(A \cap B)} = \mathrm{P(A)} + \mathrm{P(B)} - \mathrm{P(A \cup B)} = 0.3.$

(2) $\mathrm{P(A|B)} = \frac{\mathrm{P(A \cap B)}}{\mathrm{P(B)}} = \frac{3}{5}$

(3) $\mathrm{P(B|A)} = \frac{\mathrm{P(A \cap B)}}{\mathrm{P(A)}} = \frac{3}{7}$