Assignment 7

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Problem: Let A and B be independent events with $P(A) = 0.3$ and $P(B) = 0.4$. Find:

1) $P(A \cap B)$
2) $P(A \cup B)$
3) $P(A|B)$
4) $P(B|A)$

Solution:

so we have,

$$P(A) = 0.3 \tag{1}$$
$$P(B) = 0.4 \tag{2}$$

1)

$$P(A \cap B) = P(A) \times P(B) \tag{3}$$
$$= 0.3 \times 0.4 \tag{4}$$
$$= 0.12 \tag{5}$$

2)

$$P(A \cup B) = P(A) + P(B) - P(A \cup B) \tag{6}$$
$$= 0.3 + 0.4 - 0.12 \tag{7}$$
$$= 0.58 \tag{8}$$

3)

$$P(A|B) = \frac{P(A \cap B)}{P(B)} \tag{9}$$
$$= \frac{0.12}{0.4} \tag{10}$$
$$= 0.3 \tag{11}$$

4)

$$P(B|A) = \frac{P(A \cap B)}{P(A)} \tag{12}$$
$$= \frac{0.12}{0.3} \tag{13}$$
$$= 0.4 \tag{14}$$