# Assignment 1

## AI1110: Probability and Random Variables
## Indian Institute of Technology Hyderabad

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Problem 12.13.2.8

**8.** Let and B be independent events with P(A) = 0.3 and P(B) = 0.4. Find

(i) P(AB) (ii) P(A+B)

(iii) P(A|B) (iv) P(B|A)

Solution:

Given, P(A) = 0.3 , P(B) = 0.4 and A, B are independent events.

1) P(AB)

$$P(AB) = P(A) * P(B) = 0.3 * 0.4 = 0.12 \quad (1)$$

2) P(A+B)
We know that,

$$P(A + B) = P(A) + P(B) - P(AB) \quad (2)$$

$$P(A + B) = 0.3 + 0.4 - 0.12 = 0.58 \quad (3)$$

3) P(A|B)

$$P(A|B) = \frac{P(AB)}{P(B)} \quad (4)$$

$$P(A|B) = \frac{P(A) * P(B)}{(P(B)} = P(A) = 0.3 \quad (5)$$

4) P(B|A)

$$P(B|A) = \frac{P(BA)}{P(A)} = \frac{P(B) * P(A)}{P(A)} = P(B) = 0.4 \quad (6)$$