

# Assignment:- 1

## AI1110: Probability and Random Variables

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**Question:** If  $P(A|B) > P(A)$ , then which of the following is correct?

- (A)  $P(B|A) < P(B)$     (B)  $P(A \cap B) < P(A) \cdot P(B)$   
 (C)  $P(B|A) > P(B)$     (D)  $P(B|A) = P(B)$

**Solution:** We can write the given condition as:

$$P(A|B) = \frac{P(A \cap B)}{P(B)} > P(A)$$

Multiplying both sides by  $P(B)$ , we get:

$$P(A \cap B) > P(A) \cdot P(B)$$

Dividing both sides by  $P(A)$ , we get:

$$\frac{P(A \cap B)}{P(A)} > P(B)$$

$$P(B|A) = \frac{P(A \cap B)}{P(A)} > P(B)$$

$$\Rightarrow P(B|A) > P(B)$$

This is equivalent to option (C), so (C) is correct.