

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

$$\leadsto P(A|B) P(B) = P(A \cap B)$$

$$A \cap B = B \cap A$$

$$P(A \cap B) = P(B \cap A) = P(B|A) P(A)$$

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

$$P(A|B) = \frac{P(B|A) P(A)}{P(B)} \quad \leftarrow \text{BAYES}$$