

Conditional Probability

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

Probability of event A when event B is already occurred.

Multiplication law of Probability

$$P(A \cap B) = P(A) \cdot P(B|A) \rightarrow \text{dependent event}$$

$$P(A \cap B) = P(A) \cdot P(B) \rightarrow \text{Independent}$$

Q. What is the chance of throwing a total of 11 with dice if the digit on first die is 5.

$$E_1 = \text{total of eleven} = \{(5,6), (6,5)\}$$

$$E_2 = \text{first dice shows} = \{(5,1), (5,2), (5,3), (5,4), (5,5), (5,6)\}$$

$$P(E_1|E_2) = \frac{P(E_1 \cap E_2)}{P(E_2)} = \frac{1}{6}$$