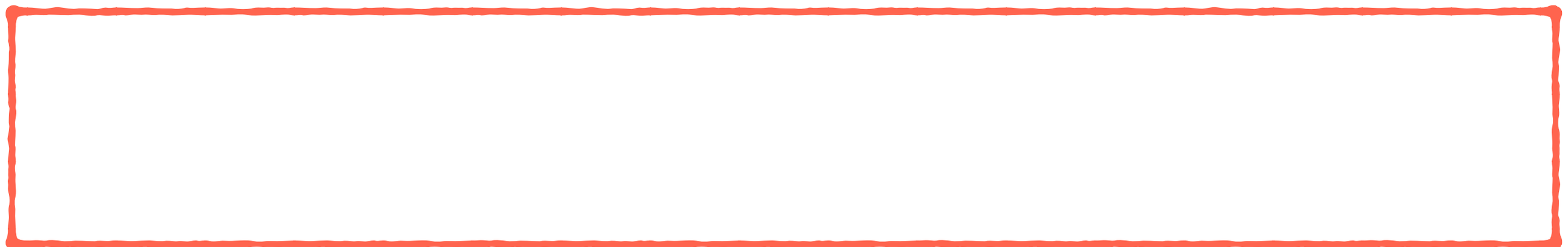
Conditional Probability Rule

probability rules

The Multiplication Rule

Independent Events and Their Complement



probability rules

Conditional Probability Rule

If A and B are events in the sample space Ω, then the conditional probability of A given B where $P(B) > 0$ is given by

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

$\Longrightarrow$ The Multiplication Rule

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

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

$$\Longrightarrow \quad P(A \cap B) = P(B)P(A \mid B)$$

Independent Events and Their Complement

Two events A and B are independent if and only if

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

Two events A and B are independent then A and $\overline{B}$ are also independent.

probability rules

Complement Rule