The Rule of Complements

\( \overline{A} = "\text{no } A" \) \( \iff \overline{A} \) is the complement of \( A \).

Suppose \( A = "\text{rain today}" \).

If \( P(A) = P(\text{rain today}) = 0.10 \),
then \( P(\overline{A}) = P(\text{no rain today}) = 0.90 \).

Rule of Complements

\[ P(A) + P(\overline{A}) = 1. \]

\[ \text{or} \]

\[ P(A) = 1 - P(\overline{A}) \leftarrow \overline{A} \text{ is simpler than } A. \]

If \( R = "\text{rain today}" \) \( \frac{1}{2} \) there is a 90% chance of rain today \( \frac{1}{2} \) tomorrow (Assume these are independent).

\( \overline{R} = "\text{no rain}" \), \( P(\overline{R}) = 10\% \).

Let \( A = \text{rain at least one of the 2 days} \).

Compute \( P(A) \) using the rule of complements.

\( \overline{A} = \text{no rain - both days} \)

\[ P(A) = 1 - P(\overline{A}) = 1 - P(\overline{R} \cap R) \]
\[ = 1 - (0.10)(0.10) \]
\[ = 1 - 0.01 = 0.99 = 99\%. \]