

The Rule of Complements

$\bar{A}$ = "not A" $\leftarrow \bar{A}$ is the complement of A.

Suppose A = "rain today".

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

Rule of Complements

$$P(A) + P(\bar{A}) = 1.$$

OR

$$P(A) = 1 - P(\bar{A}) \leftarrow \begin{array}{l} \text{Use this if} \\ \bar{A} \text{ is simpler} \\ \text{than } A. \end{array}$$

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

$\bar{R}$ = "no rain", $P(\bar{R}) = 10\%$

Let A = rain @ least one of the 2 days.

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

$\bar{A}$ = no rain - both days

$$\begin{aligned} P(A) &= 1 - P(\bar{A}) = 1 - P(\bar{R} \text{ \& R}) \\ &= 1 - (0.10) \cdot (0.10) \\ &= 1 - 0.01 = 0.99 = 99.0\% \end{aligned}$$