



# Total Probability

## 1 Why

## 2 Result

**Proposition 1.** *Let  $A_1, \dots, A_n$  be a partition of a set of outcomes  $A$ . Let  $\mathbf{P}$  be an event probability function for some probability mass function. Let  $B \subset A$  an event. Then*

$$\mathbf{P}(B) = \sum_{i=1}^n \mathbf{P}(B \cap A_i)$$

We call this result to **law of total probability**.