

## DISTRIBUTION EXPECTATION

## Why

Suppose we are going to make a bunch of measurements. We associate to each element of a finite set a number. If the measurements we make are divided into proporitions according to a distribution, if we make all the measurements and then average the results what do we expect to get.

## **Definition**

Consider a distribution p and a real-valued function f. The distribution expectation f under p is the sum of the product of the results of p and f on the elements of the set.

## Notation

Let A a finite set. Let R denote the set of real numbers. Let  $p:A\to R$ . Let  $f:A\to R$ . The expectation of f under p is

$$\sum_{a \in A} p(a) f(a).$$

