Expected value @model

(1) $$\mathrm{E}[X] = \sum_{i=1}^{n} x_i\, p_i = x_1 p_1 + x_2 p_2 + \cdots + x_n p_n.$$

where X be a random variable with a finite number of finite outcomes $x_1, x_2, \ldots, x_n$ occurring with probabilities $p_1, p_2, \ldots, p_n$, respectively.

Since all probabilities p_i add up to 1 ($p_1 + p_2 + \cdots + p_n = 1$), the expected value is the weighted average, with p_i 's being the weights.

If all outcomes x_i are equiprobable (that is, $p_1 = p_2 = \cdots = p_n = \dfrac{1}{n}$), then the weighted average turns into the simple average.

See also

Statistics