probability mass function (PMF, f_X, f)
A function describing the *probability* of a *discrete random variable* X taking a specific value in its *sample space*. It is denoted by the symbol f_X (or just f, if X is implied), where X is the random variable X or the *probability distribution* of X. Each probability distribution has its own specific PMF.

For example, throwing a ball into a bucket may have a probability of success of $p = 0.8$. Then the probability of a single success after a given number of failures is a random variable following a *geometric distribution* $X \sim Geo(0.8)$, whose PMF is

$$f(x) = (1-p)^{x-1} \cdot p$$

So the probability $P(X = 3)$ of hitting the bucket in the third trial, after two failures is:

$$f_{Geo}(3) \;=\; 0.2^2 \cdot 0.8 \;=\; 0.0032$$

To compute the probability of at least one success, the *cumulative distribution function* (CDF) would be used. The equivalent function for *continuous* probability distributions is the *probability density function* (PDF).

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