discrete uniform distribution ($X \sim U(a, b)$)
A *discrete probability distribution* that models equal *probability* across its *sample space*, i.e. each of its *outcomes* has the same probability of occurring. See figure DUD for details, figure DUC for the curves of the distribution functions.

$X \sim U(a,b)$	
PMF	$f(x) = \begin{cases} 0 & \text{if } x < a \\ \frac{1}{b-a+1} & \text{if } a \le x \le b \\ 0 & \textit{if } x > b \end{cases}$
CDF	$F(x) = \begin{cases} 0 & \text{if } x < a \\ \frac{x-a+1}{b-a+1} & \text{if } a \le x \le b \\ 1 & \textit{if } x > b \end{cases}$
Statistic	$x \in \mathbf{Z}$: outcome
Parameters	$a, b \in \mathbf{Z}; a \le b$: range
μ	$\frac{a+b}{2}$
σ^2	$\frac{(b-a+1)^2 - 1}{12}$
Skewness (γ_1)	0

Figure **DUD:** discrete uniform distribution

Example: The probability of each face of a six-sided die to show up is uniformly distributed. The corresponding random variable follows the uniform distribution $X \sim U(1, 6)$. Hence

$$f_U(1) = f_U(2) = \cdots = f_U(6) = \frac{1}{6-1+1} = \frac{1}{6}$$

and, for instance, the probability of rolling anything smaller than a 4 would be:

$$F_U(3) = \frac{3-1+1}{6-1+1} = \frac{1}{2}$$

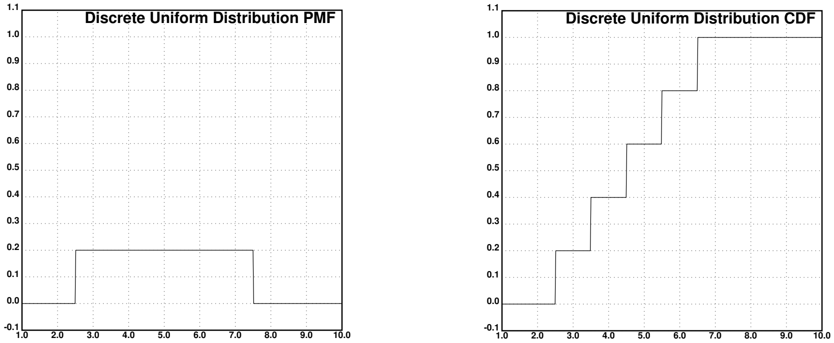

Figure **DUC:** discrete uniform distribution probability functions; left: PMF of $X \sim U(3, 7)$, right: CDF of same distribution