Random Variables

A random variable X is a function from the sample space S of an experiment to the real numbers. $X(S)$ denotes the range of the function X.

If X is a random variable defined on the sample space S, and r is a real number, then $X=r$ is an event. The event $X=r$ consists of all outcomes s in the sample space S such that $X(s)=r$

*** $p(X=r)$ is the sum of $p(s)$ for all s such that $X(s)=r$ ***

The distribution of a random variable is the set of all pairs $(r, p(X=r))$ such that $r \in X(S)$

* Think: the distribution refers to the probability distribution

The sum of the values $p(X=r)$, over all $r \in X(S)$, must equal 1.

The values $p(X=r)$ can be plotted in a histogram as a function of r: