



# The probability distribution function

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- Explain why  $\lim_{x \rightarrow -\infty} F_X(x) = 0$ .  $F_X(x)$  is the probability distribution function for the random variable  $X$
- Explain why  $\lim_{x \rightarrow +\infty} F_X(x) = 1$ .  $F_X(x)$  is the probability distribution function for the random variable  $X$
- Consider a die and explain what set of outcomes are in each of the following subsets  $\{s : (s \in \Omega) \wedge (x(s) \leq 0)\}$ ,  $\{s : (s \in \Omega) \wedge (x(s) \leq 1)\}$ ,  $\{s : (s \in \Omega) \wedge (x(s) \leq 1.5)\}$ ,  $\{s : (s \in \Omega) \wedge (x(s) \leq 4.5)\}$  and  $\{s : (s \in \Omega) \wedge (x(s) \leq 6.25)\}$ . In these expressions  $\Omega$  is used to represent the sample space for the experiment and  $x(s)$  tells you the value that comes up when the dice is rolled.
- Sketch the probability distribution function for a random variable  $X$  tells you the outcome of a fair dice roll. Indicate all the points on this curve where the function is discontinuous.



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- Write a mathematical expression using limits which tells us that the function  $f(x)$  has a discontinuity at  $a$ .