

Section 3.1: Discrete Random Variables

Wednesday, January 24, 2018 5:07 PM

a variable X is a random variable if the value it assumes in the outcome of an experiment is a chance or random event

discrete random variable \rightarrow quantitative

behaves like integers,
not real numbers

probability distribution for a discrete random variable is a formula, graph, or table that gives the possible values of X and their associated probabilities $p(x)$

example: sum of two fair 4-sided dice

$X = \text{sum}$	$p(x)$
2	$\frac{1}{16}$
3	$\frac{2}{16} = \frac{1}{8}$
4	$\frac{3}{16}$
5	$\frac{4}{16} = \frac{1}{4}$
6	$\frac{3}{16}$
7	$\frac{2}{16} = \frac{1}{8}$
8	$\frac{1}{16}$

note: the values of x must be mutually exclusive events

also: $0 \leq p(x) \leq 1$

$$\sum p(x) = 1$$

population mean - also known as the "expected value" or the "expectation value"

mean $\mu = E(x) = \sum x p(x)$

variance $\sigma^2 = E[(x - \mu)^2]$
 $= \sum (x - \mu)^2 p(x)$

formal definition (annoying to calculate)

$$= \sum x^2 p(x) - \mu^2$$

calculation formula
(USE THIS!)