Section 4.3: Discrete Random Variables

Thursday, April 2, 2020 11:56 AM

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

examples of random events:

- result of a coin flip
  note: coin does not have to be fair
- the sum of two dice when rolled
- the first card dealt in a card game

discrete random variable
- quantitative (it has a numerical value)
- can only take on certain values
  - two 6-sided dice can have a sum of 3 or 4 but not 3.75

---

probability distribution:

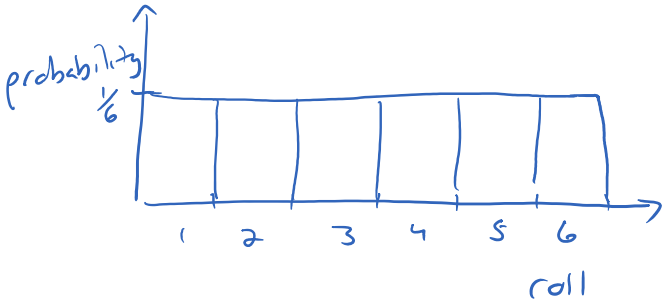
example: when you roll a fair 6-sided die,

what is the probability of each roll?

table

roll	probability
1	1/6
2	1/6
3	1/6
4	1/6
5	1/6
6	1/6
	Sum = 1

graph

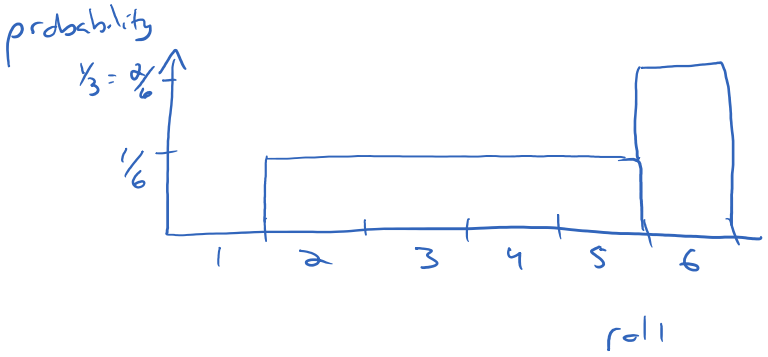


example: what is the probability of each outcome for rolling an unfair six-sided die if the probability of rolling a 2, 3, 4, or 5 is still 1/6 but the probability of rolling a 1 is zero?

table

roll	p(roll)
1	0
2	1/6
3	1/6
4	1/6
5	1/6
6	2/6 = 1/3
	sum = 1

so sum is still one



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

note: the sum of the probabilities must equal one

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

example: complete the following probability distribution

x	$p(x)$
0	$1/10$
1	$3/5$
2	$3/10$
	Sum = 1

← fill in the missing value

$= 1 - 1/10 - 3/10$

$= 6/10 = 3/5$