

5.2

Probability Distributions

Probability Distributions

Loosen our idea of a random variable to a more theoretical idea. (remove all face cards, now $X = \#$ of evens)

Recall

A random variable is a variable whose values are determined by chance.

Discrete Variables - can be counted

Continuous Variables - within an interval

ex) A discrete probability distribution

Roll a die, let r.v. $X = \#$ of dots.

X	1	2	3	4	5	6
$P(X)$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

This is a discrete probability distribution

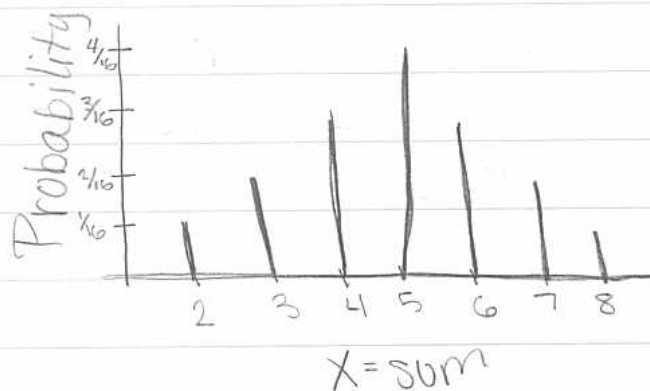
discrete probability distribution - consists of the values a random variable can assume and the corresponding probabilities of the values.

ex) 1 toss two 4-sided die. Let r.v. $X = \text{sum}$

	1	2	3	4
1	2	3	4	5
2	3	4	5	6
3	4	5	6	7
4	5	6	7	8

16 possible values of X

X	2	3	4	5	6	7	8
$P(X)$	$\frac{1}{16}$	$\frac{2}{16}$	$\frac{3}{16}$	$\frac{4}{16}$	$\frac{3}{16}$	$\frac{2}{16}$	$\frac{1}{16}$



Sometimes we write probability distributions as formulas.

ex) $P(X) = \frac{X}{3}$ for $X = 0, 1, 2$

X	0	1	2
$P(X)$	0	$\frac{1}{3}$	$\frac{2}{3}$

To Check Probability Distribution

1. $\sum P(X) = 1$

2. $0 \leq P(X) \leq 1$.