



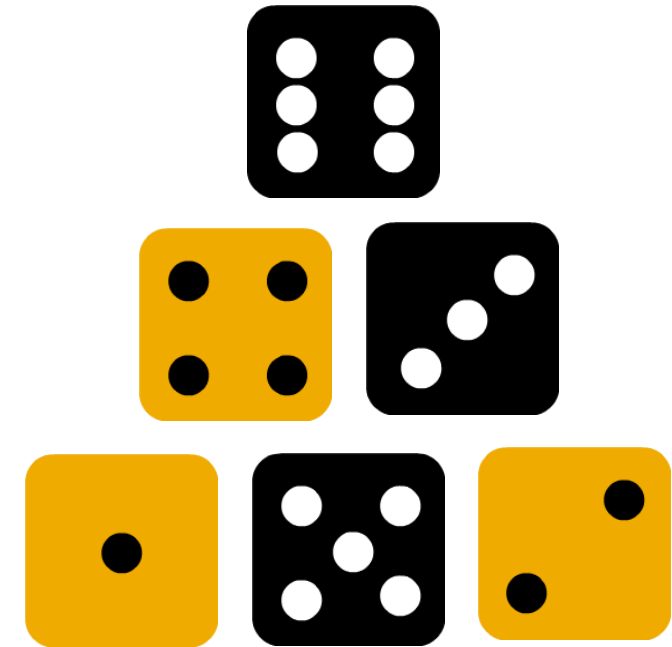
Week 5: Probability Distributions

## Unit 1: Properties of Distributions

# Properties of Distributions

## Introduction

- A probability distribution is a mathematical function that provides the probabilities of occurrence of different possible outcomes in an experiment.



<http://statisticsbyjim.com/basics/probability-distributions/>  
[https://en.wikipedia.org/wiki/Probability\\_distribution](https://en.wikipedia.org/wiki/Probability_distribution)

## Types of probability distribution

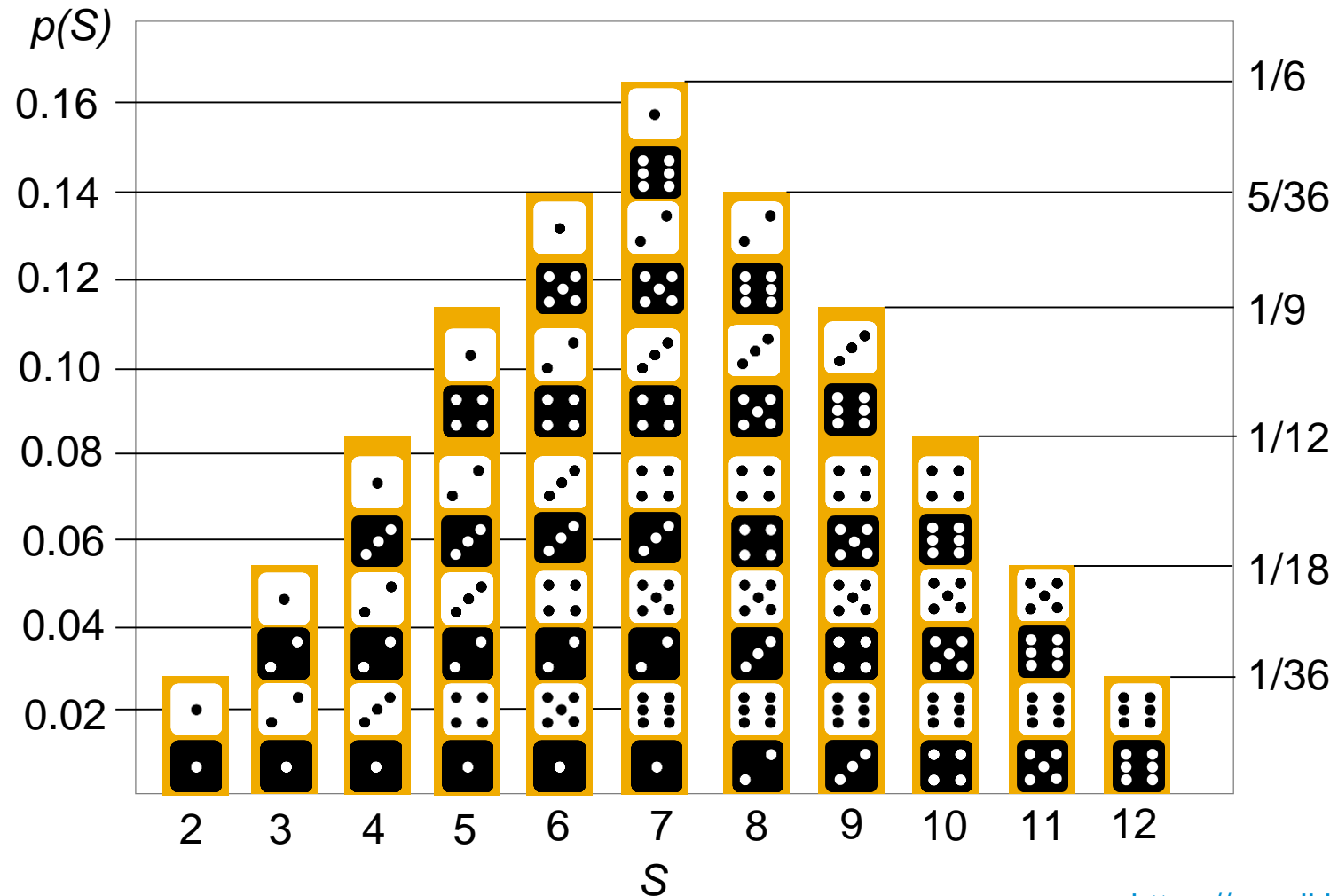
### 1. Discrete probability distribution

- The set of possible outcomes is discrete

### 2. Continuous probability distribution

- The set of possible outcomes can take on values in a continuous range

## Discrete probability functions



The probability mass function (pmf) of counts from two dice

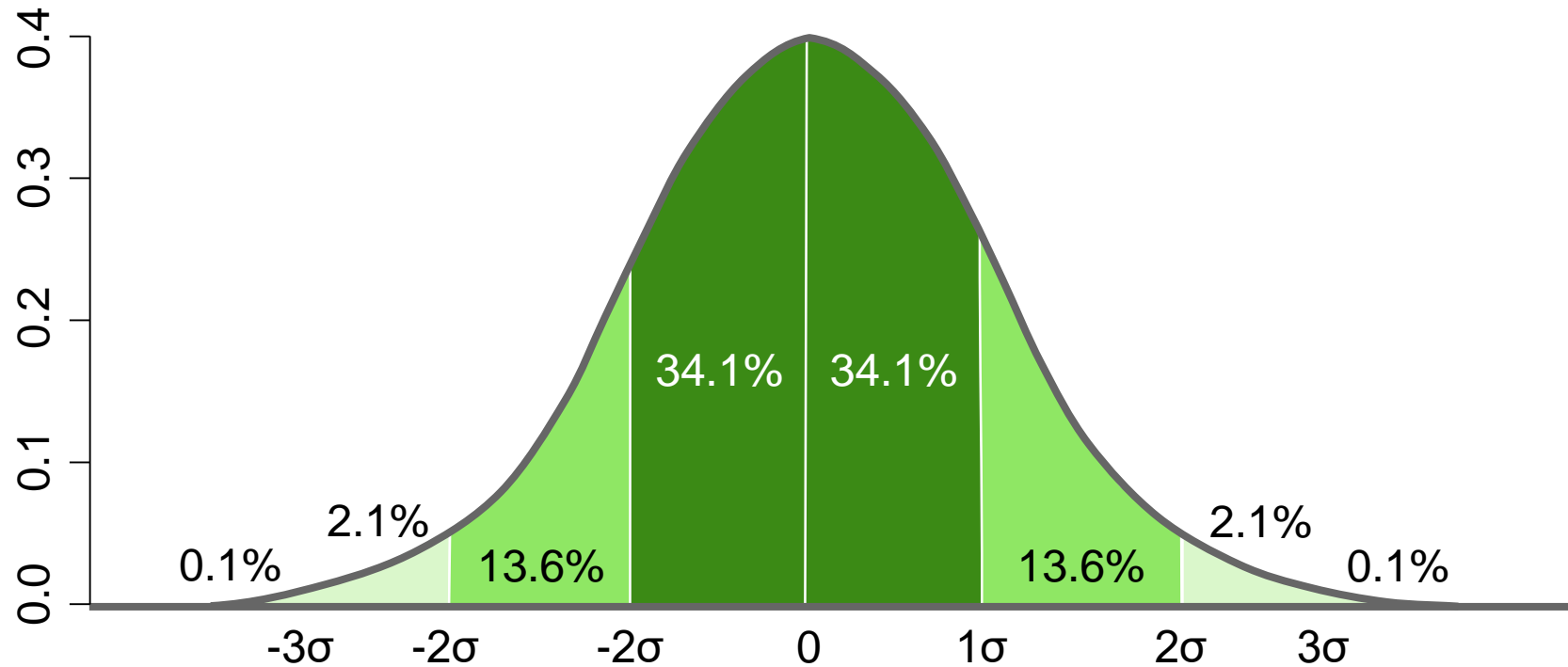
[https://en.wikipedia.org/wiki/Probability\\_distribution](https://en.wikipedia.org/wiki/Probability_distribution)

## Discrete probability example

Number of Heads	Probability
0	0.25
1	0.50
2	0.25

Flip a coin two times

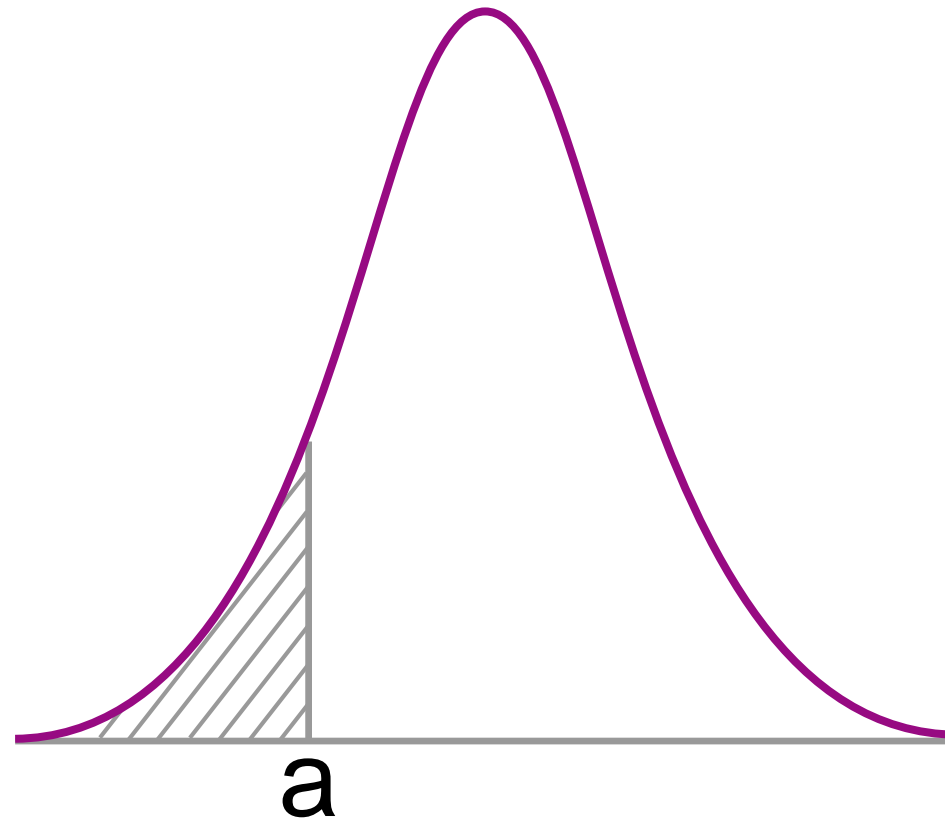
## Continuous probability functions



The probability density function (pdf) of the normal distribution

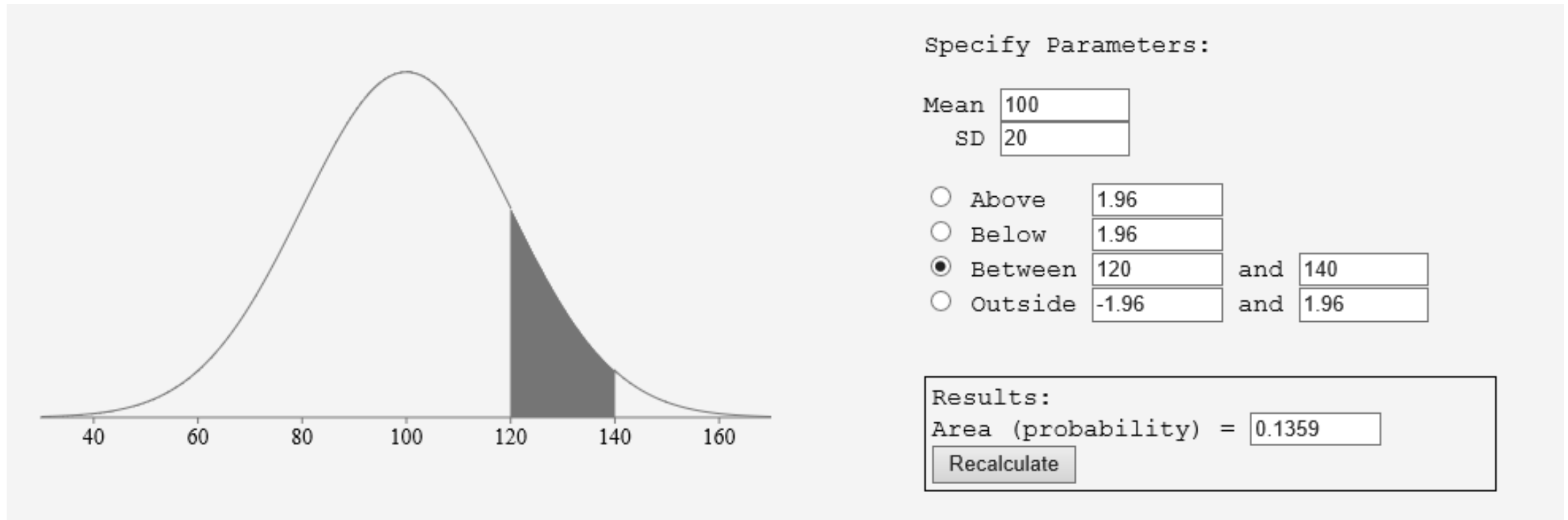
[https://en.wikipedia.org/wiki/Probability\\_distribution](https://en.wikipedia.org/wiki/Probability_distribution)

## Continuous probability example 1



Refer to <https://stattrek.com/probability-distributions/discrete-continuous.aspx> for more information.

## Continuous probability example 2



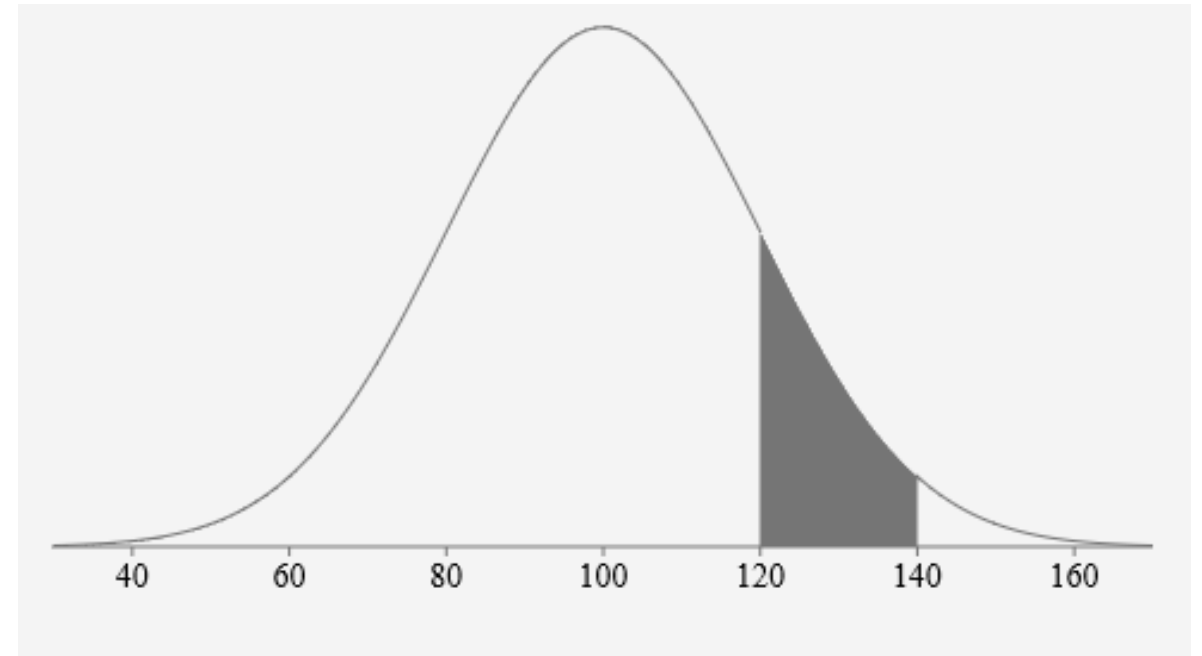
[http://onlinestatbook.com/2/calculators/normal\\_dist.html](http://onlinestatbook.com/2/calculators/normal_dist.html) to draw a normal distribution



## Continuous probability vs discrete probability distribution

Number of Heads	Probability
0	0.25
1	0.50
2	0.25

**Discrete**



**Continuous**

# Properties of Distributions

## Summary

- A probability distribution is a mathematical function that provides the probabilities of occurrence of different possible outcomes in an experiment.
- A discrete random variable can take only a finite number of different values like 0,1,2,3,4, etc., whereas a continuous random variable is a variable that can take an infinite number of possible values.
- Discrete probability functions are also known as “**probability mass functions**” and can assume a discrete number of values.
- Continuous probability functions are also known as “**probability density functions**” and the probabilities are measured over ranges of values rather than single points.



# Thank you.

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