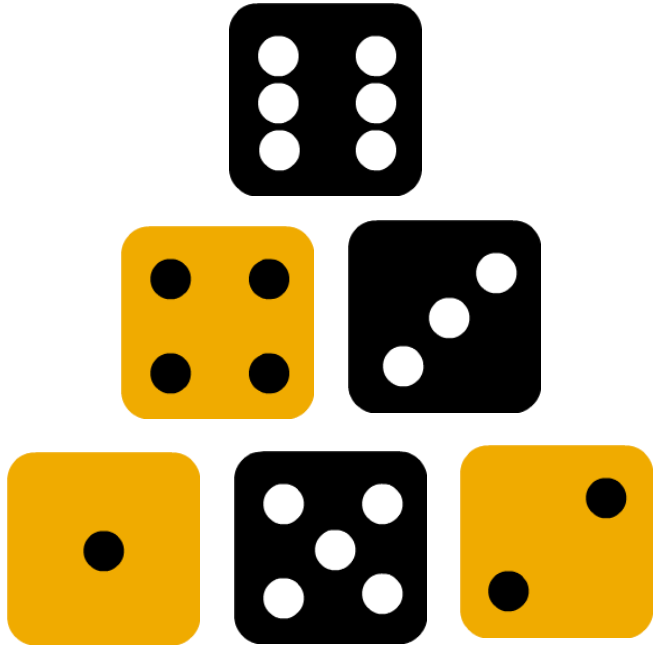
Week 5: Probability Distributions

Unit 1: 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

Types of probability distribution

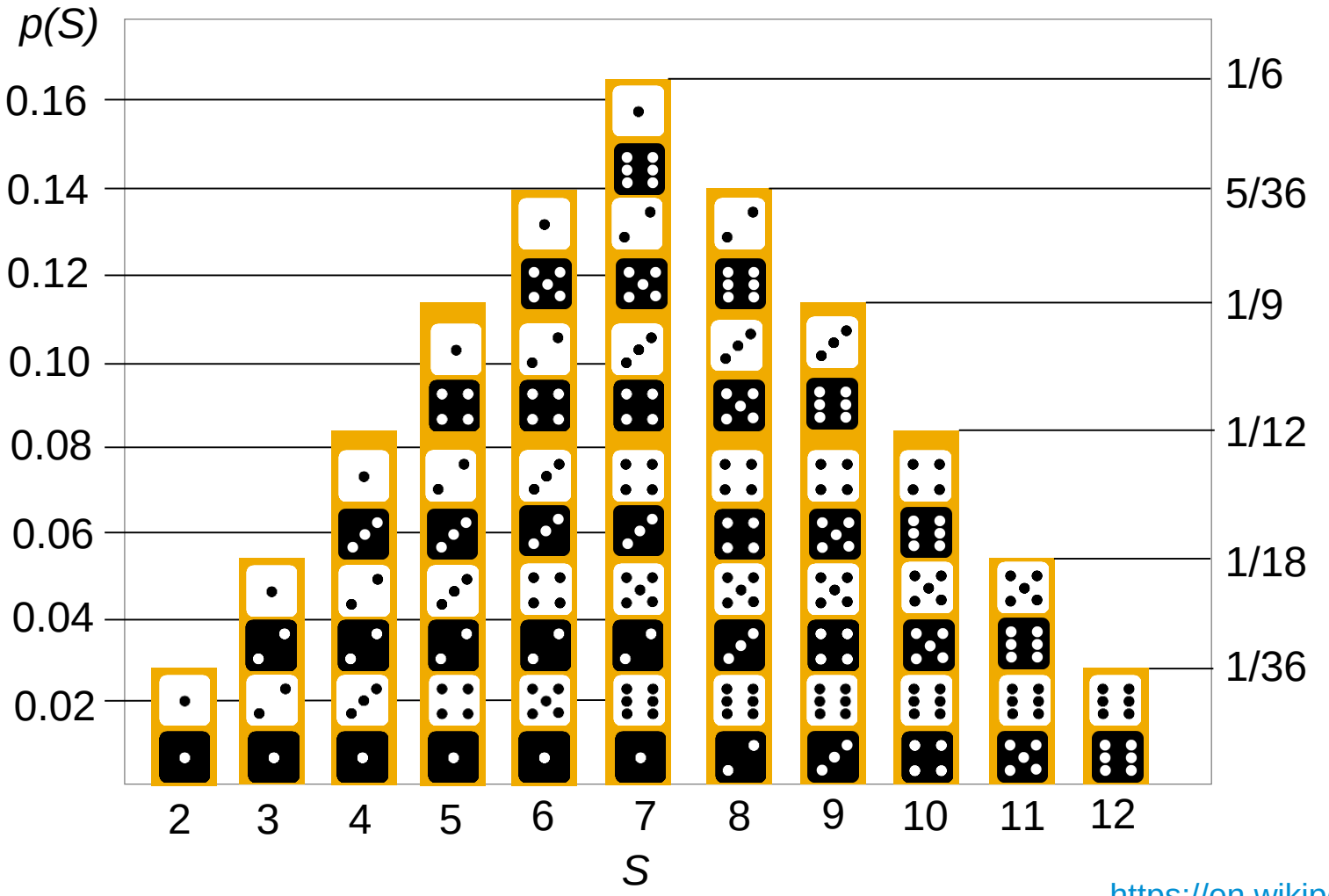
1. Discrete probability distribution

- 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

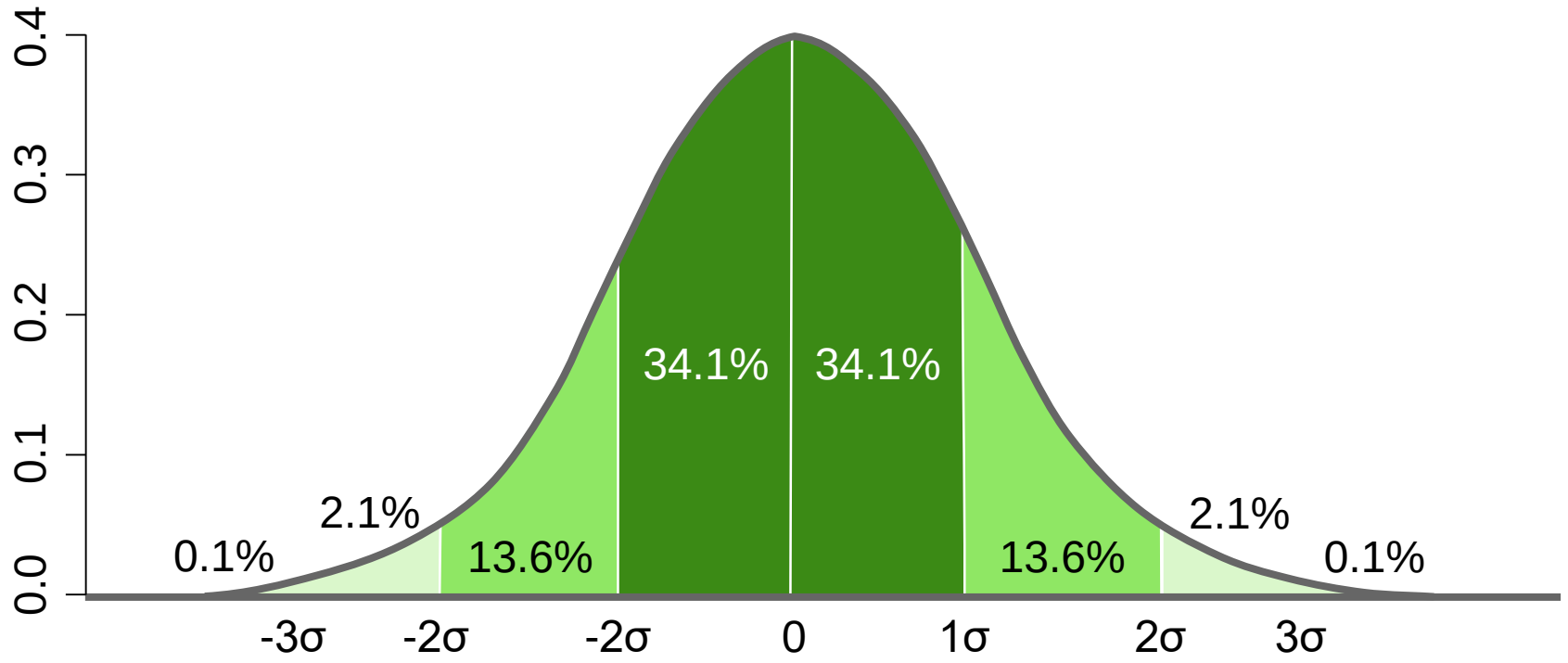
https://en.wikipedia.org/wiki/Probability_distribution

Discrete probability example

Number of Heads	Probability
0	0.25
1	0.50
2	0.25

Flip a coin two times

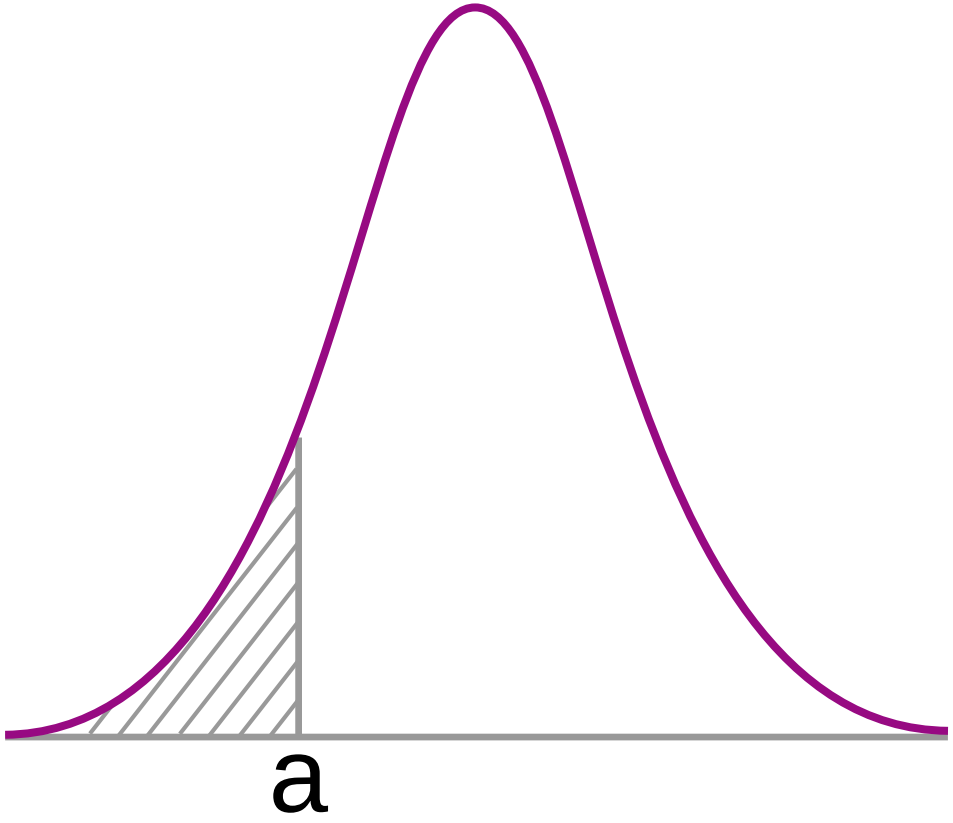
Continuous probability functions



The probability density function (pdf) of the normal distribution

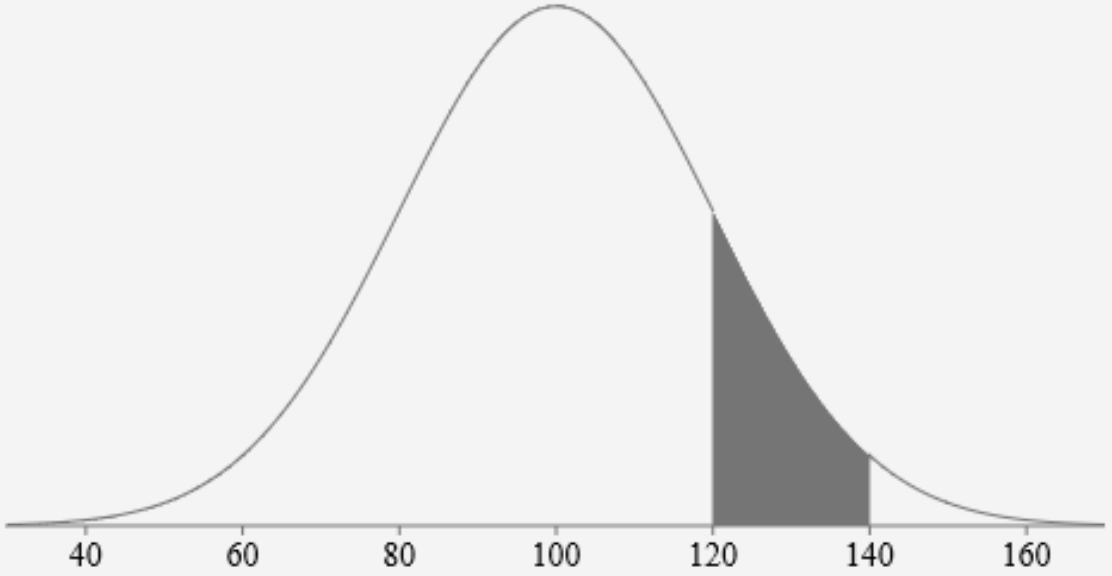
https://en.wikipedia.org/wiki/Probability_distribution

Continuous probability example 1



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

Continuous probability example 2



Specify Parameters:

Mean 100
SD 20

- Above 1.96
- Below 1.96
- Between 120 and 140
- Outside -1.96 and 1.96

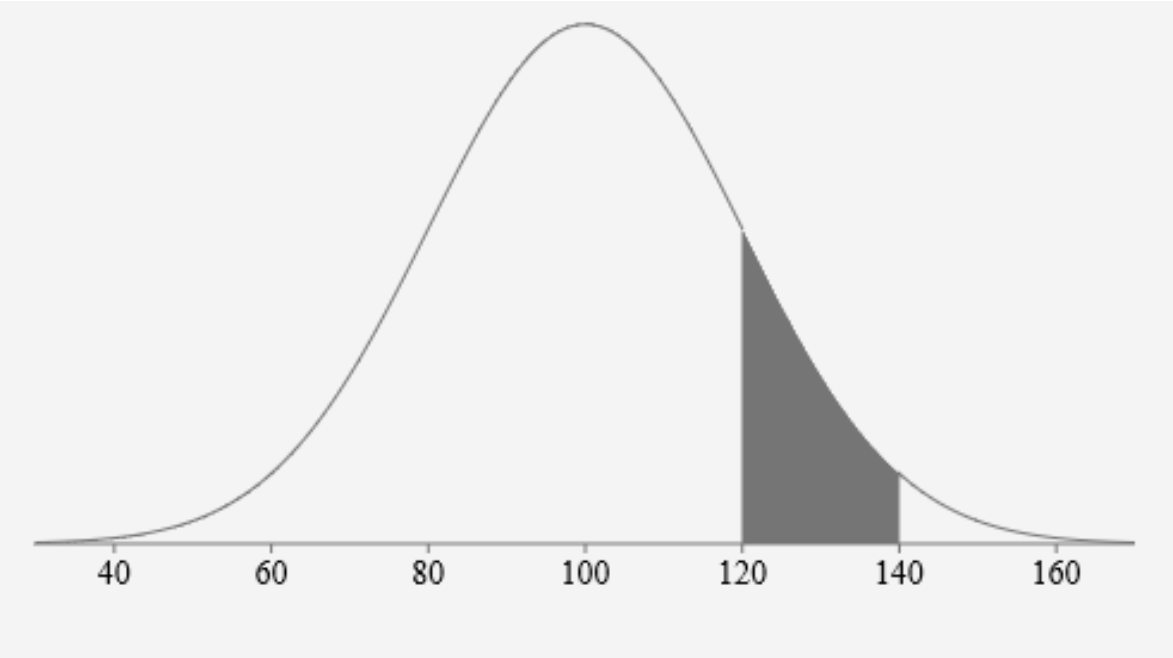
Results:
Area (probability) = 0.1359
Recalculate

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

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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