Probability

To understand probability distributions, it is important to understand variables. random variables, and some notation.

•A **variable** is a symbol (*A*, *B*, *x*, *y*, etc.) that can take on any of a specified set of values.
•When the value of a variable is the outcome of a statistical experiment, that variable is a**random variable**.

Generally, use a capital letter to represent a random variable and a lower-case letter, to represent one of its values. For example:

•X represents the random variable X.
•P(X) represents the probability of X.
•P(X = x) refers to the probability that the random variable X is equal to a particular value, denoted by x. As an example, P(X = 1) refers to the probability that the random variable X is equal to 1.

Let's roll the dice!

What is the probability of getting the following sides?

1	2	3	5	6

What is the probability of getting the following sides?

1	2	3	5	6
1/6	1/6	1/6	1/6	1/6

Let's flip a coin
twice!

What is probability of getting heads in one toss?

$50\% = 0.5 = 1/2 = Outcome\ (x)/All\ possible\ outcome$

What are the possible outcomes?

Flip 1	Flip 2
H	H
H	T
T	H
T	T

What are the possible outcomes?

Number of heads	Probability
0	0.25
1	0.50
2	0.25

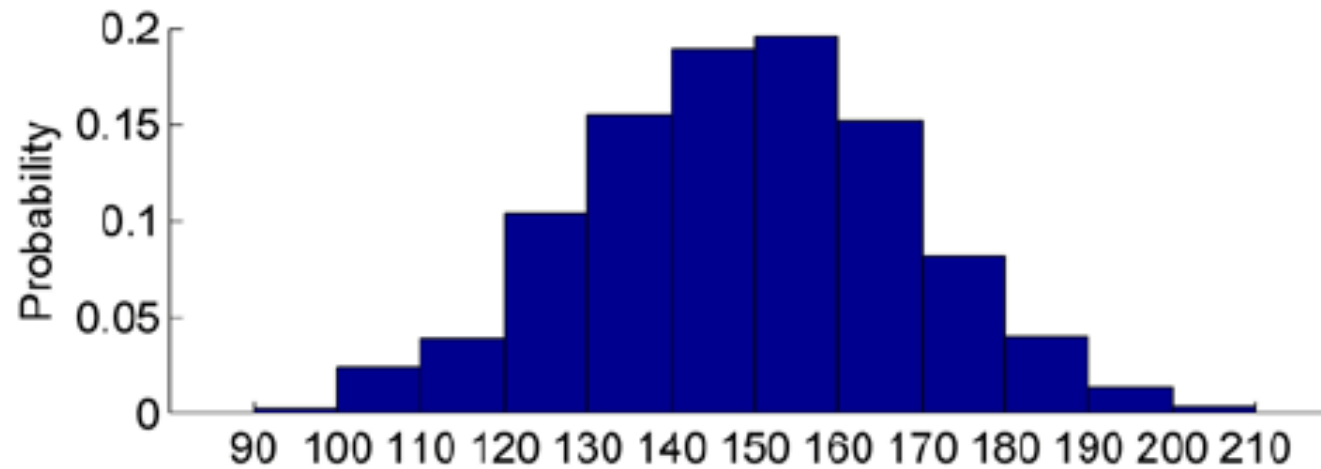A cumulative probability refers to the probability that the value of a random variable falls within a specified range.
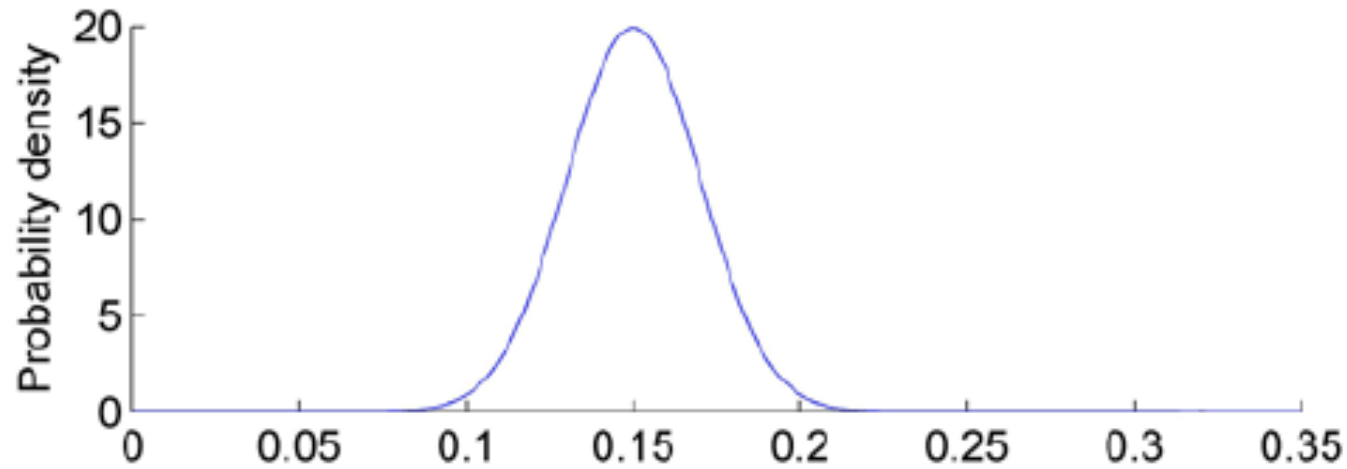

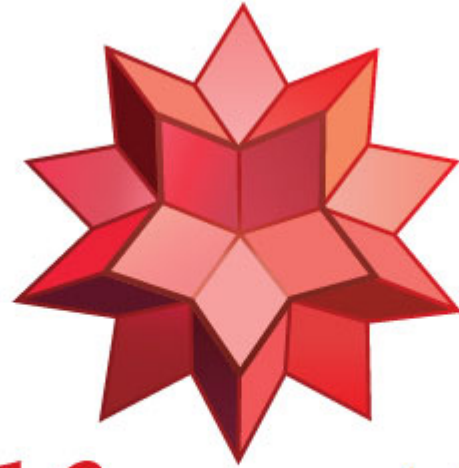P(X < 1) = P(X = 0) + P(X = 1) = 0.25 + 0.50 = 0.75

Like a probability distribution, a cumulative probability distribution can be represented by a table or an equation.

Number of heads: x   Probability: P(X = x)
            Cumulative Probability: P(X < x)

0   0.25   0.25
1   0.50   0.75
2   0.25   1.00

Discrete vs. Continuous

http://www.wolframalpha.com/examples/Probability.html