

Some Simple Concepts in BASIC PROBABILITY

Simple, intuitive approach will meet our needs

Range of the Probability Number

$P(.)$



f : The impossible event

S : The sure event

Probability and Relative Frequency

Baseball example

At bats

Hits

Relative Frequency of a Hit

Probability of a Hit

Relative Frequency Interpretation

In the long run

Probabilities and Events

Vocabulary: Event

Event A = Hit

Summary of relative frequency use of the probability number

Subjective Estimates of Probability

Equiprobable Sample Spaces

Roll 1 Die



Define: Sample Space (**S**)

In the roll of 1 die: **S** =

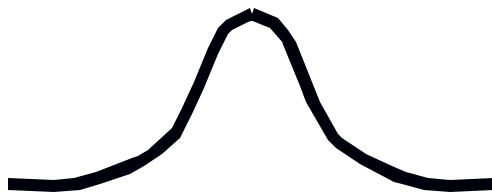
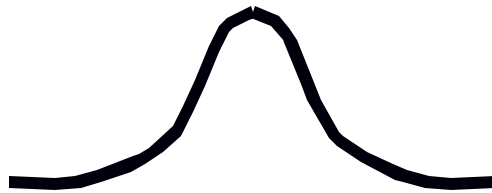
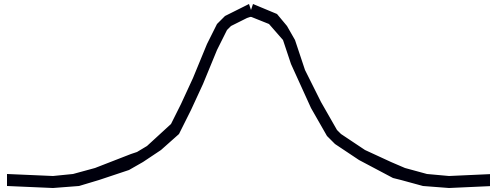
Equiprobable outcomes

$$P(1) = P(2) =$$

Turning 1 Die Roll into a Probability Distribution



Areas under Curves



INDEPENDENCE

Definition

Example

Independence Product Rule

Example:

Prob(Sydney Temp > 95 AND Pass Exam) =

In general

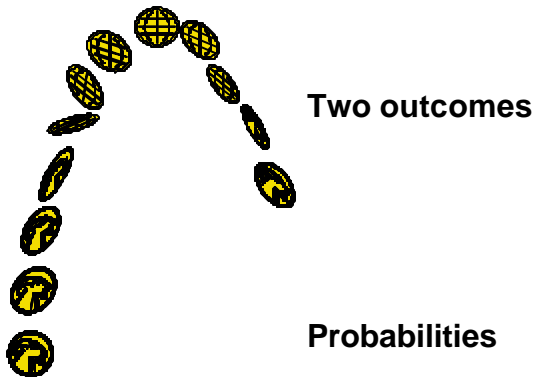
If

Then

Conversely

Flipping Coins

Flip 1 Coin



Bernoulli Trials

A process that...

Success

Failure

$P(\text{Success}) =$

$P(\text{Failure}) =$

$p + q =$

Flip 2 Coins

Independence

Probability of 2 Heads

First Flip: $P(H) =$

2nd Flip: $P(H) =$

Product Rule

$P(HH) =$

Flip 3 Coins**Probability of 3 Heads**

And so on...

Drawing Cards**A standard deck**

52 cards

4

13

52 cards are all possible outcomes

Sample Space:

Equiprobable outcomes

One draw

Randomly draw one card:

$P(\text{K of Hearts}) =$

Replace card and randomly draw another cards

$P(\text{Ace of Spades}) =$

Probability of any single card

What is the probability of an Ace?

What is the probability of a black card?

2 Independent Draws

1st Draw

Shuffle
Draw
Record
Replace

2nd Draw

Independence

Draw 1st card

Draw 2nd card

$P(\text{K of Hearts AND Ace of Spades}) =$

What is the probability of Ace on 1st draw and Black card on the 2nd?

Summary of Probability Basics

Interpretations of the probability number

Relative Frequency

In the long run

Subjective probability

Simple logic on Sample Spaces of Equiprobable Outcomes

Areas under curves

Independence Product Rule

For independent events

$P(AB) =$

If $P(AB) =$

Then