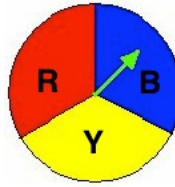


PROBABILITY Worksheet #1

Suppose we flip a coin and spin a spinner with three colors at the same time.



What is the sample space for the coin?

What is the sample space for the spinner?

Draw a diagram and use it to write out the sample space for when we both flip the coin and spin the spinner.

Compute the following probabilities and record them in the table below. List each probability in three ways: as fractions, decimals, and percentages.

- (1) The probability of a Tail on the coin.
- (2) The probability of Red on the spinner.
- (3) The probability of a Tail on the coin and Red on the spinner.
- (4) The probability of a Tail on the coin or Red on the spinner.
- (5) The probability the color on the spinner is not Red.
- (6) The probability of Green on the spinner.
- (7) The probability of a Head on the coin and either Blue or Yellow on the spinner.

Event	Fraction	Decimal	Percentage
P(Tail)			
P(Red)			
P(Tail and Red)			
P(Tail or Red)			
P(Not Red)			
P(Green)			
P(Head and either Blue or Yellow)			

PROBABILITY Worksheet #2

Part 2

A “run” is a repetition of Heads or Tails when you flip. For example, a “Run of length 3” is either

HHH or TTT

and a “Run of length 5” is either

HHHHH or TTTTT.

Look at the previous page and your GUESS.

How many “Runs of Length 3” appear in your guess?

How many “Runs of Length 4” appear in your guess?

How many “Runs of Length 5” appear in your guess?

How many “Runs of Length 6” appear in your guess?

How many “Runs of Length 7” appear in your guess?

Now look at the previous page and look at your ACTUAL FLIPS.

How many “Runs of Length 3” appear in your actual flips?

How many “Runs of Length 4” appear in your actual flips?

How many “Runs of Length 5” appear in your actual flips?

How many “Runs of Length 6” appear in your actual flips?

How many “Runs of Length 7” appear in your actual flips?

PROBABILITY Worksheet #3

Suppose a drug-sniffing dog correctly identifies illegal drugs 80% of the time. This means that:

- (1) If a person has illegal drugs on them, 80% of the time the dog will correctly identify the drugs and start barking, and 20% of the time the dog will miss the drugs and not bark.
- (2) If a person does not have illegal drugs on them, 80% of the time the dog will correctly not bark, but 20% of the time the dog will incorrectly start barking.

Suppose that you are a police officer with such a dog working a Jay-Z concert. At the Jay-Z concert, 1 in every 100 people has illegal drugs on them. If your K-9 partner starts barking at a person, what is the probability that that person actually has illegal drugs?

To help you answer this question, suppose that at the concert 1000 people are sniffed by the dog, and fill out the following table.

# of people without drugs	# of correct negatives (people without drugs, and dog does not bark)	# of false positives (people without drugs, and dog does bark)
# of people with drugs	# of correct positives (people with drugs, and dog does bark)	# of false negatives (people with drugs, and dog does not bark)

$P(\text{person that the dog barks at has drugs}) =$

Question: In light of this probability, how do you think you should treat suspects that the dog barks at before you search them and actually determine whether or not they are in possession of illegal drugs?

10-Year Flood: 10% Chance
100-Year Flood: 1% Chance
500-Year Flood: 0.2% Chance

What Does All This Really Mean?



.....
DURING ANY SINGLE YEAR:

House A:
Has a **0.2%** chance of flooding.

House B:
Has a **1%** chance of flooding.

House C:
Has a **10%** chance of flooding.

.....
DURING ANY 30-YEAR MORTGAGE:

House A:
Has a **6%** chance of flooding.

House B:
Has a **26%** chance of flooding.

House C:
Has a **95%** chance of flooding.

.....
BUT...

The deeper these houses are in the floodplains, the **WORSE** the damages will be.



PROBABILITY Worksheet #4

Question 1: If you have two people, what is the probability that they share a birthday?

Question 2: If you have three people, what is the probability that at least two of them share a birthday? (Hint: Try to calculate the probability all of them have different birthdays, and then subtract this probability from one.)

Question 3: If you have 23 people, what is the probability that at least two of them share a birthday? (Hint: Try to calculate the probability all of them have different birthdays, and then subtract this probability from one.)

Question 4: If you have 57 people, what is the probability that at least two of them share a birthday? (Hint: Try to calculate the probability all of them have different birthdays, and then subtract this probability from one.)