

Know coin → 2 sides (heads or tails)
die → 6 sides (1, 2, 3, 4, 5, 6)

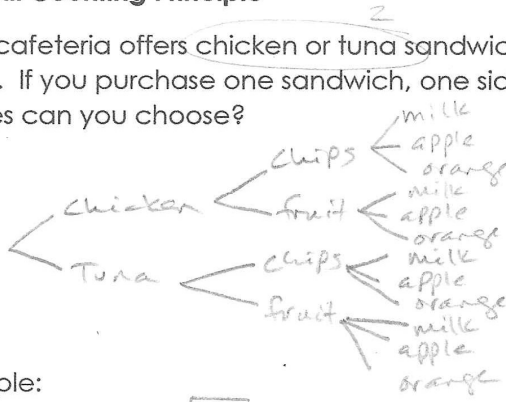
Deck of Cards 52 Black + Red cards
 Suits: hearts, diamonds, spade, club
 13 cards in each suit 2-10, ace, king, queen, jack
 Face cards Name: Key
 → king, queen, jack Date: _____

Geometry
 Counting Principle & Basic Probability

The Fundamental Counting Principle

1. Your school cafeteria offers chicken or tuna sandwiches; chips or fruit; and milk, apple juice, or orange juice. If you purchase one sandwich, one side item, and one drink how many different lunches can you choose?

Tree Diagram:



Counting Principle:

$2 \cdot 2 \cdot 3 = 12$

2. At a sporting goods store, skateboards are available in 8 different deck designs. Each deck design is available with 4 different wheel assemblies. How many skateboard choices does the store offer?

$8 \cdot 4 = 32$

3. A father takes his son, James, to Wendy's for lunch. He tells James he can get a 5 piece nuggets, a spicy chicken sandwich, or a single for the main entrée. For sides, he can get fries, a side salad, baked potato, or chili. And for drinks, he can get a frosty, coke, sprite, or an orange drink. How many options for meals does James have?

3 entrees
 4 sides
 4 drinks
 $3 \cdot 4 \cdot 4 = 48$

4. I-pods can vary the order in which songs are played. Your i-Pod currently only contains 8 songs. Find the number of orders in which the songs can be played. (this ends up being a factorial!!!)

$8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1 = 40,320$
 → Factorial: $8! = 40,320$

5. To decide on punishments, Dr. Bishop flips a coin (Heads- ISS, Tails- OSS). He flipped a coin 3 times on the first day of school. Draw a diagram.

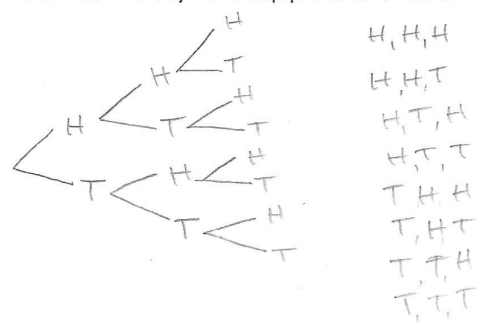
Number of Outcomes 8

P(all ISS) $\frac{1}{8}$

P(all OSS) $\frac{1}{8}$

P(1 ISS and 2 OSS) $\frac{3}{8}$

P(2 ISS and 1 OSS) $\frac{3}{8}$



Term	Definition	Example
Event	an action that has an outcome(s)	Rolling a die
Sample Space	the set of all possible outcomes	1, 2, 3, 4, 5, 6
Outcome	a single result in the sample space	3

event will not occur
event will occur
event is certain
event is uncertain

Term	Definition	Example
Random Event	Outcome is uncertain	Flip a coin
Probability	Likelihood that an event will occur	$\frac{1}{2}$
Favorable Outcome	Number of times that a particular event occurs	$\frac{1}{2}$ ← favorable outcome

outcome you are looking for in the experiment
← total # of outcomes

Formula

$$P(E) = \frac{\# \text{ of favorable outcomes}}{\# \text{ of total possible outcomes}}$$

Probability of an event occurring must fall between 0 and 1

Let's Try Some!

1. A dice cube has 6 sides that are numbered 1 to 6. If the cube is thrown once, what is the probability of rolling an odd number? $\frac{3}{6} = \frac{1}{2}$

2. If one letter is chosen at random from the word REFUSE, what is the probability the letter chosen will be an "E"? $\frac{2}{6} = \frac{1}{3}$

3. The sides of a number cube have the numbers 2, 4, 8, 9, 4, and 7. If the cube is thrown once, what is the probability of rolling a 7? $\frac{1}{6}$

4. A bag containing 12 red marbles, 10 green marbles, 2 yellow marbles, 19 blue marbles, and 9 purple marbles. What is the probability of pulling out a green marble? $\frac{10}{52} = \frac{5}{26}$

5. In a survey of 3630 college students, 1162 stated that they cheated on an exam. If one of these college students is randomly selected, find the probability that he or she cheated on an exam. $\frac{1162}{3630} = .31$