

Sample Spaces and Tree Diagrams

A **sample space** is the set of all possible outcomes in a probability experiment. It is important to quantify all possible outcomes since probability is defined as the ratio of favorable outcomes to possible outcomes.

We saw on the Do-Now that the number of possible breakfast combinations was 12. What is the probability of correctly predicting the breakfast combination that a random customer will choose?

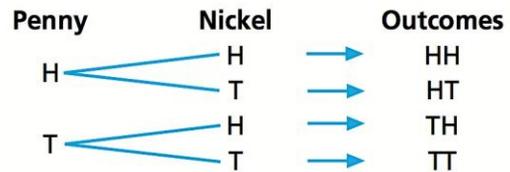
When you flip a coin twice there are four possible outcomes. This sample space can be shown using a table, a tree diagram, or set notation.

First toss	H	T	H	T
Second toss	H	T	T	H

table

{HH, TT, HT, TH}

Set notation {braces}



Tree diagram

What is the most likely sum when rolling two standard dice?

	R	R	R	R	R	R
G						
G						
G						
G						
G						
G						

At the county fair, Andy found a game in which the player would toss a pair of standard dice. If the dice showed a sum of 2, 3, 4, 5, 10, 11, or 12, the player would win a prize. If the dice showed a sum of 6, 7, 8, or 9, the player would lose.

Andy decided to play since he thought his chances of winning would be greater than his chances of losing.

Andy's reasoning: There are seven chances of winning and only four chances of losing.

There is something wrong with Andy's reasoning. Explain his error.



The Naples Country Club has the following rules for coding their membership cards.

Rule 1: Letters and numbers may be used only once in each card.

Rule 2: A membership code must be two numbers followed by two letters.

Using the given rules, list the possible codes for membership cards that can be made from these letters and numbers.

1, 6, 7, 5, P, N

Using these same rules, calculate the number of membership codes that could be created using any non-zero number, and any letter.