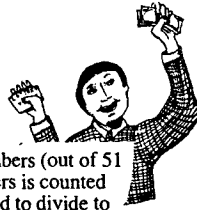


- IC-51. In the California state lottery there are 51 numbers to choose from. How many ways are there to choose 6 of the 51 numbers? How many combinations of 6 numbers can be chosen from the list of 51?



Our numerator represents the total number of ways to arrange six numbers (out of 51 numbers) where the order matters. Each group of the same six numbers is counted $6! = 720$ times. Since they are the same and grouped together, we need to divide to find out how many combinations there are without regard to order.

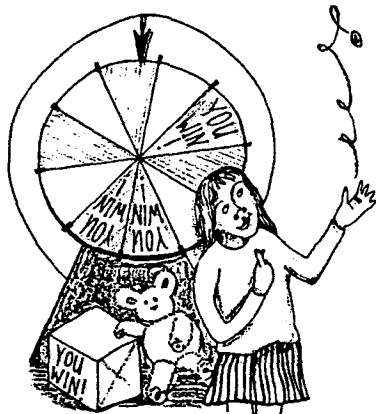
- Find the number of possible combinations for the California Lottery.
- What is the probability of selecting the six winning numbers?

- IC-52. Five cards are drawn from a standard deck of 52 cards.

- Show a decision chart for the number of choices for the first card, second card, and so forth up to the fifth card, and write the total number of arrangements of the cards that you found using permutation notation.
- How many ways can you arrange the five cards selected? Write your answer both as a number and using a factorial.
- Since order generally does not matter when playing cards, we need to divide out the number of repetitions of the same set of five cards. Calculate the number of five card hands that can be selected from a deck of 52 cards.

- PM-56. On the midway at the County Fair there are many popular games to play. One of them is Flip-to-Spin-or-Roll. You start by flipping a coin. If heads comes up, you get to spin the big wheel, which has ten equal sectors: three red, three blue, and four yellow. If the coin shows tails, you get to roll a cube with three red sides, two yellow sides, and one blue side. If your spin lands on blue or the blue side of the cube comes up, you win a stuffed animal.

- Draw both an area diagram and a tree diagram to represent Flip-to-Spin-or-Roll.



- b) What is the probability of winning a stuffed animal?
 c) If you won, what is the probability you started with heads?

- IC-59. Two cards are dealt from a randomly shuffled deck (a regular deck of 52 cards). To establish the sample space for this problem you need to think of choosing two from a set of 52.

- How many ways are there to do this?
- How many diamonds are there? How many ways to choose two diamonds out of all the diamonds in the deck? What is the probability of dealing two diamonds from the whole deck of 52 cards?
- What is the probability of dealing two face cards?

- IC-76. You and one of your friends are chosen to be captains of the A and B soccer teams during PE. Your PE teacher asks each of you to pick a number from 1 to 10. What is the probability that:

- your number is greater than your friend's number?
- your number is equal to your friend's number?
- your number is less than your friend's number?

- IC-124. If five cards are dealt from a shuffled deck of playing cards:

- What is the probability of getting a five card hand that is all red?
- What is the probability of getting a five card hand that is all clubs?
- What is the probability of getting a flush (5 cards from any one suit)?

Name _____

1. At Burrell's Sandwich Shop, all sandwiches are made with one meat, one cheese and bread. The choices for meat are ham, roast beef and turkey. The choices for cheese are cheddar and swiss. The choices for bread are white or wheat.

- a) How many different sandwiches can be made? _____
- b) Show the sample space by completing the tree diagram.

MEAT

CHEESE

BREAD

H

RB

- c) If a sandwich is chosen at random, what is the probability that it will have ham and swiss?
- d) If a sandwich is chosen at random, what is the probability that it will have wheat bread?
- e) If a sandwich is chosen at random, what is the probability that it will have roast beef?

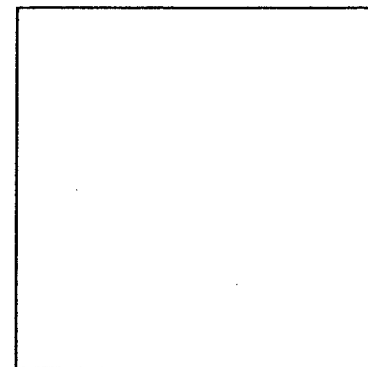
2. Make a decision chart to help you answer the following questions:

- a) How many 5-digit numbers could you make with the digits 1 – 7, if you could not repeat the use of any digit?
- b) How many 5-digit numbers could you make with the digits 1 – 7, if you could repeat the use of any digit?
- c) How many 5-digit numbers could you make with the digits 1 – 7, if the first digit is an even number and if you could not repeat the use of any digit ~~and the number~~?

3. Suppose you roll two dice, one red and one white. The red die is a normal fair die but the white die has two 4's and no 1's.

- a) Complete the area diagram of the possible outcomes.

RED



WHITE

- b) Find the probability that at least one of the die comes up three. _____
- c) Find the probability that the white die and the red die come up with the same number. _____
- d) Find the probability that the sum of the numbers on the two dice is eight. _____
- e) Find the probability that exactly one of the die shows a two. _____