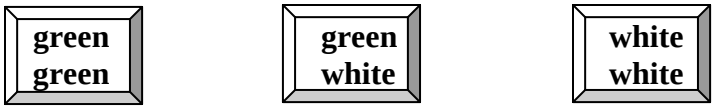
Pre 3.6 Probability Problem Solving

Boxes and marbles



Three boxes contain two marbles. One has 2 green marbles. One has 2 white marbles One has 1 green marble and 1 white marble.

The boxes are labeled incorrectly. You want to reach into one of the boxes and pull out a single marble and be able to tell from that one marble what's in all of the boxes.

How can this be done? Be sure you consider all possibilities. Explain your plan.

The Bag Game

In this game you have one of the following bags containing 30 colored chips in one of the combinations listed below:

Bag A:25 red, 5 blue Bag B:20 red, 10 blue Bag C:10 red, 20 blue

Without looking in the bag, you may draw out one of the following samples and make a prediction of which bag you have. The amount of money you receive depends upon which option you choose. Below are the possible options.

Draw 5 chips and guess correctly, you win $100.
Draw 10 chips and guess correctly, you win $75.
Draw 15 chips and guess correctly, you win $50.
Draw 20 chips and guess correctly, you win $25.
Draw 25 chips and guess correctly, you win $10.

Which option do you choose and why?

Rolling Doubles and Triples

If a group of people each roll TWO dice 36 time each most people will roll a double about six times. What are the real (theoretical probability)chances of rolling a double?

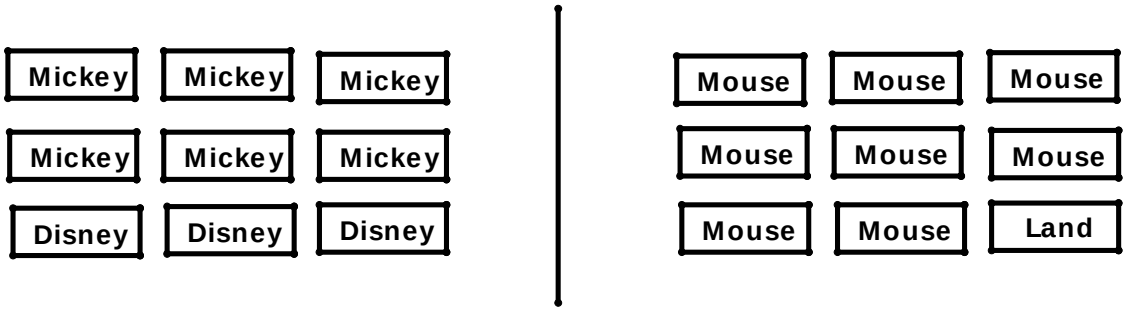
If the same people roll THREE dice 36 times, what are the chances of rolling a double? What are the chances of rolling a triple?

Collect some experimental data. Use a calculator if you wish. Then find a way to determine the theoretical probabilities.

Mickey Match

You are given the chance to compete for prizes, including the final SUPER prize, a trip to Disneyland for you and your family. The board consists of a left side and a right side. Each side of the board has 12 cards lying face down. The contest involves building a match. First you will select a card from the left side. Then you decide whether or not you will select a card from the right side. A match consists of either:

You may stop at any time and keep the prizes you have won, or continue on to the final competition. The cards are face down in random order. After each contest, the cards are shuffled and placed down again.



Prize One: A Disneyland T-Shirt
To win this prize you must pick from the left a card titled Mickey or Disney.
What is the probability of winning a t-shirt?

Prize Two: A stereo or a trip to Disneyland
Now you must choose whether you want to keep the t-shirt and stop playing or try for a stereo or a trip to Disneyland. If you make a set by choosing Mickey and Mouse, you win the stereo. If you make a set by choosing Disney and Land, you win a trip to Disneyland. If you don't make a set of either Mickey Mouse or Disney Land, you go home with no prize.

What is the probability of winning a stereo?

What is the probability of winning a trip to Disneyland?

What is the probability of going home with no prize?

How would you choose to play this game? Explain your choice.

Spinners for Math Day

Howard is in charge of the Spinner Game for Math Fair. There will be about 300 people at the fair The school wants to raise money for some math software. Hal wants to charge $1 to play the game and give cash prizes so he won't have to bother shopping for prizes. He wants to make $100 profit.

Design a plan. Be sure you show the spinners you would recommend and the rules you think would work. Explain why your spinners and rules make sense.

Dressing Steve

Steve likes to dress all in one color. Because of his little brother who sleeps later than he does, Steve gets up early and dresses in the dark. He has four sets of clothes, each set includes pants, shirt, and sweater. He has a blue set, a red set, a black set and a brown set.

What are the chances of at least pulling out a matching shirt and pants from the dark closet on a given day? What are his chances are for pulling out a complete matching set, pants, shirt and sweater. How many of each item he would have to pull out to be sure of getting a matching set?

Design a system for figuring these questions out.