



Try these problems before watching the lesson.

1. How many different sequences of 5 consecutive coin flips consist of 4 heads and 1 tails?
2. How many different sequences of 5 consecutive coin flips consist of 3 heads and 2 tails?
3. A fair coin is flipped 37 times. What is the probability that the total number of heads is greater than the total number of tails?
4. I have a trick coin that is twice as likely to come up heads as it is to come up tails. If I flip this coin 4 times, what is the probability that I get 3 heads and 1 tails?



First Problem: A fair, six-sided die has two red, two blue and two yellow faces. The die is rolled three times. What is the probability of getting each color once?

Second Problem: A bag contains red marbles and blue marbles. If two marbles are chosen at random without replacement, the probability that both marbles are red is $\frac{1}{5}$, and the probability that both marbles are blue is also $\frac{1}{5}$. How many marbles are in the bag?

Third Problem: An ant is standing at the origin of a coordinate grid. The ant will take four steps, each 1 unit in length. Each step taken is either forward, backward, right or left, chosen at random. What is the probability that the ant's fourth step places the ant back at the origin?

 *Follow-up Problems*

5. A bag contains red balls and white balls. If five balls are to be pulled from the bag, with replacement, the probability of getting exactly three red balls is 32 times the probability of getting exactly one red ball. What percent of the balls originally in the bag are red?
6. Two of the vertices of a regular octahedron are to be chosen at random. What is the probability that they will be the endpoints of an edge of the octahedron?
7. There are 11 students in Ms. McGinn's Chemistry class, including the Baker triplets: Annika, Billy, and Catherine. The teacher calls all 11 students in random order one at a time to her desk to tell each student his or her final grade. What is the probability that Billy is the first of the triplets that she calls to her desk?
8. Alice, Bob, and Carol are playing in a three-way chess championship. They repeatedly play three-way chess games. All three players participate in each game, and each game has one winner. The championship continues until one person has won 3 games. If each of the players is equally likely to win each game, then what is the probability that Carol wins the championship in exactly 6 games?

 *Share Your Thoughts*

Have some thoughts about the video? Want to discuss the problems on the Activity Sheet? Visit the MATHCOUNTS Facebook page or the Art of Problem Solving Online Community (www.artofproblemsolving.com).