



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. Each marble in my marble bag is either green or purple. I pull out marbles one at a time at random, write down the color of the marble, and then put the marble back in the bag. If I do this 6 times, how many different sequences of resulting colors have “purple” four times and “green” twice?
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? Express your answer as a common fraction.



First Problem: 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?

Second Problem: A bag contains five red marbles, three blue marbles and two green marbles. Six marbles are to be drawn from the bag, replacing each one after it is drawn. What is the probability that two marbles of each color will be drawn?

 *Follow-up Problems*

5. I have a bag with 5 red balls and 10 orange balls. Five times I pull a ball at random out of the bag, record its color, and then put the ball back in the bag. What is the probability I pull out a red ball exactly three times? Express your answer as a common fraction.
6. The probability that the Phillies win any game against the Yankees is $\frac{2}{3}$. The two teams play a “best-of-seven” series, which ends when one of the two teams has won four games. What is the probability that the Phillies win the series 4 games to 2? Express your answer as a common fraction.
7. How many different ways are there to arrange the six letters in the word BANANA? (The three A’s are identical, as are the two N’s.)
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? Express your answer as a common fraction.

 *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).