

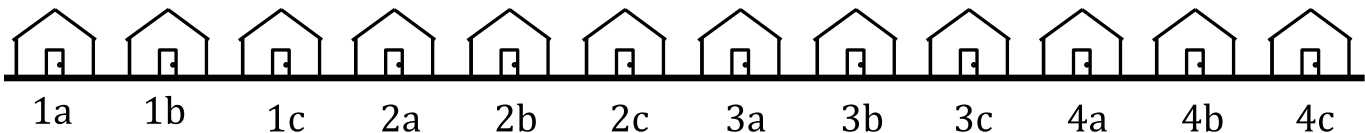
Discussion #1

Name:

1. Probability & Combinatorics

- (a) In the Powerball Lottery, there are $N = 69$ balls in a cage, numbered 1 through 69, and in the first part of the lottery, $n = 5$ are sampled without replacement by repeatedly sampling a ball uniformly from the remaining subset. How many subsets of five balls could we possibly draw?
- (b) If you correctly pick 3 of the 5 numbers drawn in the Powerball Lottery, you win \$8 (a ticket costs \$2). What is the chance of correctly picking 3 of the 5 numbers drawn, assuming you guess the numbers at random?
- (c) To win the Jackpot in the Powerball Lottery, one must choose the correct subset of 5 balls from part (a), as well as matching a ‘megaball’ chosen uniformly between 1 and 35 from a different cage. What is the chance of winning the Jackpot, assuming you guess the numbers at random?
- (d) What is the probability that the second regular ball is numbered 20?

2. Sampling Strategies



Kalie wants to measure interest for a party on her street. She assigns numbers and letters to each house on her street as illustrated above. She picks a letter “a”, “b”, or “c” at random and then surveys every household on the street ending in that letter.

- (a) What kind of sample has Kalie collected?
- (b) What is the chance that two houses next door to each other are both in the sample?
- (c) Now suppose Kalie instead picks one house beginning with ‘1’ at random, one house beginning with ‘2’ at random, and so on, so she surveys four houses, one of each number. What kind of sample has Kalie collected?