

1. You have an urn with 5 red balls, 10 blue balls, and 15 black balls. You draw 5 balls without replacement.
  - a. What is the probability that you draw  $i$  red balls and  $j$  blue balls?
  - b. Suppose you win \$1.00 for each red ball and \$3.00 for each blue ball. How much are your average winnings?
  
2.
  - a. Simplify  $\sum_{1 \leq i \leq n} \frac{3^{n+i}}{5^{n+2i}}$ .
  - b. Simplify  $\sum_i (n - i + 1)^2 \binom{n}{i} 5^i$ .
  
3. Suppose you have a table of  $n$  different numbers in random order. Suppose you search through the table, starting at the second number until you find a number bigger than the first number.
  - a. What is the probability that you examine  $i$  numbers? What is the probability that you don't find a bigger number?
  - b. What is the average number of numbers examined?