

- ① How many arrangements of the letters of "TENNESSEE" are there?
- ② How many integers in $\{1, 2, \dots, 9999\}$ are odd and have distinct digits?
- ③ How many ways are there to distribute 4 toys to 6 children if
- The toys are distinct, and any child can get more than 1 toy?
 - The toys are distinct, and no child can get more than 1 toy?
 - The toys are identical, and no child can get more than 1 toy?
- ④ How many ways can 30 Turks and 10 Greeks be seated
- in a row so that the Greeks all sit together?
 - in a circle so that no two Greeks sit next to each other?
- ⑤ Find the number of ways to choose a committee of 8 people from a group of 15 men and 25 women if the committee must contain
- at least one man.
 - at least 6 women, and Jim and Molly refuse to be on a committee together.
- ⑥ If 32 identical sticks are lined up in a row, find the number of ways to choose 8 sticks so that
- no two of the chosen sticks are consecutive,
 - there are at least 2 sticks between each pair of chosen sticks.
- ⑦ Find the number of integers between 1 and 60,000 (inclusive) which are not divisible by 4, 6, or 10.
- ⑧ A) Simplify the expression $\sum_{k=0}^n (-1)^k \binom{n}{k} 3^k$.
- B) Simplify $\binom{24}{15} + \binom{24}{14} + \binom{25}{14}$ using Pascal's formula.
- ⑨ Find the number of integral solutions of the equation $x_1 + x_2 + x_3 + x_4 = 26$ with $2 \leq x_1 \leq 8$, $-1 \leq x_2 \leq 4$, $3 \leq x_3 \leq 7$, $2 \leq x_4 \leq 16$.
- ⑩ How many ways can you divide a group of 15 people into 4 numbered teams so that every team has at least one person?
- ⑪ Find a recurrence relation for h_n , the number of n -letter codewords using the letters a, b, c if the sequences abc and acb are not allowed in a codeword.
- ⑫ Find the number of permutations of $\{1, \dots, 7\}$ which leave exactly 3 integers in their natural position, and simplify your answer.