1. How many arrangements of the letters of "TENNESSEE" are there?

2. How many integers in \{1, 2, 3, 4, 9999\} are odd and have distinct digits?

3. How many ways are there to distribute 4 toys to 6 children if
   a) the toys are distinct, and any child can get more than 1 toy?
   b) the toys are distinct, and no child can get more than 1 toy?
   c) the toys are identical, and no child can get more than 1 toy?

4. How many ways can 3 turkeys and 10 gourds be seated
   a) in a row so that the gourds all sit together?
   b) in a circle so that no two gourds 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
   a) at least one man.
   b) 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
   a) no two of the chosen sticks are consecutive,
   b) there are at least 3 sticks between each pair of chosen sticks.

7. Find the number of integers between 1 and 60,000 (inclusive)
   which are divisible by 4, 6, or 10.

8. a) Simplify the expression \( \sum_{k=0}^{n} (-1)^k \binom{n}{k} 3^k \).
    b) Simplify \( \binom{24}{15} + \binom{24}{14} + \binom{24}{14} \) using Pascal's formula.

9. Find the number of integral solutions of the equation
   \( x_1 + x_2 + x_3 + x_4 = 26 \) with \( 2 \leq x_1, x_2 \leq 8, \ -1 \leq x_3, x_4 \leq 4, \ 3 \leq x_3 \leq 7, \ 2 \leq x_4 \leq 16. \)

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, 2, 3, 7\} which leave exactly 3 integers in their natural position, and simplify your answer,