# TMA1201 Tutorial 10 - T8 Combinatorics

1. 4 chairs are arranged in a row. In how many different ways can 6 students be seated?

2. Find the number of 5-digit even numbers that can be formed using the digits 1, 2, 3, 4 and 5 without repetition.

3. In how many ways can all the letters in the word 'PICTURE' be arranged without repetition such that the 3 vowels must be side by side to one another?

4. 2 girls and 4 boys are to be seated in a row of 5 chairs. Find the number of ways they can be seated if no two persons of the same gender are next to each other.

5. Suppose repetitions are not allowed. Find the number of 4-digit even numbers that are greater than 4000 can be formed using the digits 2, 4, 5 and 7.

6. James wants to choose 2 out of 5 places of interest from a tour package. In how many ways can this be done?

7. A tutorial class contains 7 male students and 5 female students. Find the number of ways that the class can elect:
   (a) a class representative;
   (b) two class representatives, one male and one female;
   (c) a class representative and a deputy class representative.

8 Show that $|P(A)| = 2^{|A|}$

9 A drawer contains a dozen brown socks and a dozen black socks, all unmatched. A man takes socks out at random in the dark.
   a) How many socks must he take out to be sure that he has at least two socks of the same color?
   b) How many socks must he take out to be sure that he has at least two black socks?

10) There are 50 baskets of peaches. Each basket contains 1 to k peaches. Find the largest value k so that at least 3 baskets containing the same number of peaches.

11) Find the number of possible solutions for
$x_1 + x_2 + x_3 = 10$ where $x_1, x_2, x_3$ are non-negative integers.