Combinatorics Exercises

1. An assembly plant wants to hire 5 male and 6 female workers. 6 men and 8 women apply for the job. How many ways can the desired workers be selected? *(168)*

2. A box contains 30 parts numbered from 1 to 30. How many ways can we select 6 parts such that among them there are 3 parts with specific numbers? *(2,925)*

3. A shipment contains 100 boxes: 75 are quality **A** and 25 are quality **B**. How many ways can we select a 12-box sample in which the quality **B** goods do not exceed 30%? *(686,128,883,942,025)*

4. 12 students rent three boats: one with 3 seats, another with 4 seats, and the third with 5 seats. In how many ways can they be seated in the boats? *(27,720)*

5. How many five-digit numbers starting with 15 can be formed using the digits 1, 3, 5, 7, 9, if each digit can be used only once? *(6)*

6. In how many ways can the letters of the word MATHEMATICS be arranged (i.e., permutations of the word)? *(4,989,600)*

7. How many four-digit even numbers can be formed using the digits 0, 1, 2 (with repetition allowed)? *(36)*

8. 10 students qualified for the university sports day running competition. The first 3 will receive medals. How many different ways can the list of medalists be arranged? *(720)*

9. With a regular die, we roll four times in succession, and we write down the results in the order of the rolls. How many different four-digit numbers can be obtained?

10. How many three-digit numbers are there in which every digit is even?

11. Among the 15 students in a tank class, a total of five prizes are drawn in a raffle. A student can receive more than one prize. How many different outcomes are possible for the raffle?

12. How many subsets does a set with 6 elements have?

13. At a party, 7 people meet, and everyone shakes hands with everyone else. How many handshakes are there in total?

14. 15 entries were received for a competition. Three entries will be awarded, each with 20,000 Ft. In how many ways can the prizes be distributed if they cannot be shared?

15. How many subsets of the set {0, 1, 2, 3, …, 9} have at least 7 elements?

16. We have fabric in red, white, green, and blue colors, and we want to make flags. Each flag consists of horizontal stripes, and adjacent stripes cannot be the same color. How many different flags can we make if:
    1. each flag must have two stripes?
    2. each flag must have three stripes?

17. After a graduation ceremony, each student in a student circle received a photo from each of their classmates. How many students graduated if a total of 992 photos were exchanged?

18. We placed red, white, and black dice in a box. We randomly draw two and roll them. How many possible outcomes are there for this experiment?

From:
https://edu.iit.uni-miskolc.hu/ - **Institute of Information Science - University of Miskolc**

Permanent link:
https://edu.iit.uni-miskolc.hu/tanszek:oktatas:techcomm:combinatorics_exercises?rev=1728385136

Last update: **2024/10/08 10:58**