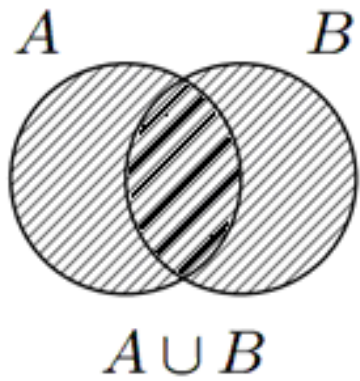


MAVZU:

***Kombinatorika
elementlari***

Reja:

1. Kombinatorikaning asosiy qoidolari: qo'shish (jamlash), kiritish-chiqarish va ko'paytirish qoidolari.
2. O'rin almashtirishlar, o'rinlashtirishlar, birikmalar.



***Kiritish-chiqaris
qoidasi :***

$$|A \cup B| = |A| + |B| - |A \cap B|$$

O'rinlashtirishlar.

Takrorlanuvchi o'rinlashtirishlar soni:

$$\overline{A_n^m} = n^m$$

Takrorlanmaydigan o'rinlashtirishlar soni:

$$A_n^m = n(n-1)(n-2)....(n-m+1) = \frac{n!}{(n-m)!}$$

Misollar

1. 20 ta belgidan tashkil topgan alfavit berilgan bo'lsin. Uzunligi 3 ga teng bo'lgan so'zlar sonini sanab chiqaylik. Bunda belgilarning barchasi takrorlanmasin.

$$A_{20}^3 = 20(20 - 1)(20 - 2) = 6840$$

$$A_n^m = n(n - 1)(n - 2) \dots (n - m + 1) = \frac{n!}{(n - m)!}$$

2. 20 ta belgidan tashkil topgan alfavit berilgan bo'lsin.

Uzunligi 3 ga teng bo'lgan so'zlar sonini sanab chiqaylik. Bunda belgilarning ayrimlari takrorlanishi mumkin.

$$\overline{A}_{20}^3 = 20^3 = 8000$$

O'rin almashtirishlar.

TAKRORSIZ:

$$P_n = 1 \cdot 2 \cdot \dots \cdot (n-1) \cdot n = n!$$

TAKRORLI:

$$P(n_1, n_2, \dots, n_k) = \frac{(n_1 + n_2 + \dots + n_k)!}{n_1! n_2! \dots n_k!}$$

Misollar

1. *Afsuski, bugun, yomg'ir, yog'adi*
so'zlaridan nechta gap tuzish mumkin?

$$P_n = 1 \cdot 2 \cdot \dots \cdot (n - 1) \cdot n = n!$$

$$P_4 = 1 \cdot 2 \cdot 3 \cdot 4 = 24$$

2. “KOMBINATORIKA” soʻzidan nechta anagramma tuzish mumkin?

$$P(2, 2, 1, 1, 2, 1, 2, 1, 1) = \frac{13!}{2! \cdot 2! \cdot 2! \cdot 2!} = \frac{13!}{16}$$

$$P(n_1, n_2, \dots, n_k) = \frac{(n_1 + n_2 + \dots + n_k)!}{n_1! n_2! \dots n_k!}$$

Birikmalar.

$$C_n^m = \binom{n}{m} = \frac{n!}{m!(n-m)!}$$

Misol

Ikkita unli va uchta undosh fonemadan iborat besh fonemali soʻzlar soni

$$C_5^2 = \frac{5!}{2!3!} = \frac{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5}{1 \cdot 2 \cdot 1 \cdot 2 \cdot 3} = 10$$

$$C_n^m = \binom{n}{m} = \frac{n!}{m!(n-m)!}$$