

Date :

Subject :

1- How many way to choose 2 students from AI Department, that has a population of 250 students?

$$\frac{n!}{(n-r)! \times r!} = \frac{250!}{(250-2)! \times 2!} = \frac{250 \times 249 \times 248!}{248! \times 2!}$$
$$= \frac{250 \times 249}{2!} = 31125$$

2- How many distinct bit strings can be formed from three 0's and two 1's?  $n=5$        $0 \rightarrow 2$   
 $1 \rightarrow 2$

$$\frac{n!}{n_1! \times n_2! \times \dots} = \frac{5!}{2! \times 3!} = 10$$

How many bit strings of length 5, start and with 1's?  
5 bit

Suppose  $\Rightarrow$ 

|   |   |   |   |
|---|---|---|---|
| 1 | 1 | 1 | 1 |
| 0 | 0 | 0 |   |

 Permission  

|   |   |   |  |     |
|---|---|---|--|-----|
| 1 | 0 | 1 |  | = 8 |
| 0 | 1 | 0 |  |     |
| 1 | 0 | 0 |  |     |
| 0 | 0 | 1 |  |     |
| 1 | 1 | 0 |  |     |
| 0 | 0 | 1 |  |     |

Date :

Subject :

4. If three awards are given each year to football team members. If there are 30 players this year in this team, and each one of them can receive at most only one award, how many possible ways are there?  $n=30$   $r=3$

$$\frac{n!}{(n-r)!r!} = \frac{30!}{(30-3)! \times 3!} = 4060$$

5. How many ways to select 3 books from 6 solution if each of the books are distinct?  $n=6$   $r=3$

$$\frac{n!}{(n-r)!r!} = \frac{6!}{(6-3)! \times 3!} = 20$$

6. When you are rolling a pair of (fair) dice three times. What is the probability that, least one of the three tries, you roll at least one odd number?

4, 3

5, 2 = 12 = 1

6, 1 = 6 = 1

3, 4 = 12 = 1

2, 5 = 10 = 1

1, 6 = 6 = 1

$$\frac{n!}{(n-r)!r!} = \frac{36!}{(36-1)! \times 1!} = 36$$

= 36 = 1

Date :

Subject :

7- How many ways to select 3 books from 6 Solution if

there are 2 books that should not both be chosen together,

$$n=4 \quad r=3$$
$$nCr = \frac{r!}{(n-r)! \times r!} = \frac{4!}{2! \times 3!} = 4$$

$$n=2 \quad r=1$$
$$nCr = \frac{2!}{(2-1)! \times 1!} = 2$$

$$n=4 \quad r=2$$
$$nCr = \frac{4!}{(4-2)! \times 2!} = 6$$

$$= 4+2+1 \\ 4+6+2 = 12$$

8- In a Discrete Mathematics class, that contains 25 students,

among whom are two students with name "Ahmed" and two students

with name "Sally", two students with name "Mariam", two students

with name "Yousef", and two students with name "Ibrahim" (along

with the remainder twenty two students whose names are all distinct

from those five name and from one another's name).

Date :

Subject :

(a) How many different 14-student study-groups can be formed such that within the study group, there is exactly one student with name "Ahmed", exactly one student with name "Sally", exactly one student with name "Mariam", exactly one student with name "Yousef", and exactly one student with name "Ibrahim"?  
arrangement not important

$$2C_1 \times 2C_1 \times 2C_1 \times 2C_1 \times 2C_1 = 2 \times 2 \times 2 \times 2 \times 2 = 32 \\ A \times I \times S \times Y \times m$$

$$20C_9 = \frac{20!}{(20-9)! \times 9!} = 167960 \\ = 32 \times 167960 \quad \cancel{\times}$$

(b) If the instructor is randomly assigning 14 of the students to a project-team, so what is the ways this team could be formed such that this team will contain two students both

Date :

Subject :

With name "Ahmed", two students both with name "Sally",

two students both with name "Mariam", two students

both with name "yousef", and two students both with name

"Ibrahim"?

$$2C_2 \times 2C_2 \times 2C_2 \times 2C_2 \times 2C_2 = 1 \\ A \times I \times S \times Y \times m$$

$$15C_4 = \frac{15!}{(15-4)! \times 4!} = 1365$$

$$= 1365 \times 1 = 1365 \quad \#$$