People's Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research

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Faculty of Economics, Commerce and Management Sciences

Department of Basic Education

Level: 1st year Bachelor degree

Section: 1st and 2nd section

Subject: Mathematics 01

Exercises serie n :01

Exercise 01 : Write the following in the simplest possible form:

- $3!\times(0!)^2$
- $\frac{10!}{5!}$
- $\frac{9!}{6!\times3!}$
- $\frac{7!\times5!}{5!}$
- $\frac{3!+4!}{2!}$
- $\frac{(n+1)!}{(n-1)!}$
- $\frac{(2n+1)!}{(2n-1)!}$
- $\frac{2n!-(2n-1)!}{2(n!)-(n-1)!}$
- $\frac{3n!+(3n-2)!}{(3n-1)!}$

Exercise 02 :

1/ Evaluate the following: A_5^2, A_3^3, C_6^2, C_4^3.

2/ Prouve that:

- $C_{n-1}^3 + C_{n-1}^2 = C_n^3$
- $C_n^{n-2} = C_n^2$
- $\frac{n!}{2!(n-2)!} = \frac{A_n^2}{2!}$
- $PC_{n+1}^p = (n+1)C_n^{p-1}$

Exercise 03 : In each of the following cases, determine the natural number 'n'

- $C_n^1 + C_n^2 = 10$
- $2A_n^2 + 50 = A_{2n}^2$
- $\frac{2n!}{(2n-2)!} + 2n = 4$

Exercise 04 : If 4 maths books are selected from 6 different maths books and 3 english books chosen from 5 different English books, how many ways can the 7 books be arranged on a shelf?

a/ If there are no restrictions

b/If the 4 maths books remain together

Exercise 05 : Determine whether each situation involves permutation or a combination then find the number of possibilities

- Checking out 4 library books from a list of 8 books for a research paper.
- Choosing the first, second and third place finishers in a race with 10 competitors.
- From a group of 10 men and 12 women, how many committees of 5 men and 6 women can be formed?
- An arrangement of the letters in the word "isosceles"

Exercise 06 :

1/ Use the binomial theorem to expand

- $(1+x)^4$
- $(2+x)^3$
- $(1-3x)^2$
- $(a-b)^7$

2/ Find the coefficient of x^5 in the expansion of $(1+4x)^9$