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ASSIGNMENT

SOLUTION

PERMUTATION

NAME: _____

Email ID _____

LOCATION _____

SCHOOL COLLEGE COMPETITIVE EXAM _____

Q1) Evaluate the expression

- i) ${}^{10}P_7$
- ii) 7P_4

Answer:

- i) 604800
- ii) 840

Q2) In how many ways, we can arrange all the letters of each word?

- i) PROVINCE
- ii) CANADA

Answer:

- i) 8!
- ii) $6!/3!$

Q3) Solve for the variable

$${}^n P_3 = 60$$

Answer

$$n = 5$$

Q4) How many different ways are there to place four different coloured tiles in a row? Assume the tiles are red, blue, green and yellow.

Answer:

24

Explanation:

$$4 \times 3 \times 2 \times 1 = 24$$

Q5) How many different ways are there to place three different coloured tiles chosen from a set of five different coloured tiles in a row? Assume the five tiles are red, blue, green, yellow and orange.

Answer:

60

Explanation:

$${}^5 P_3 = 60$$

Q6) In a school soccer league with seven teams, in how many ways can they finish in the position's "winner", "runner-up" and "third place?"

Answer:

210

Hint:

Winner: 7; Runner up: 6; Third: 5

$${}^7P_3 = 210$$

Q7) It is required to seat 4 Women and 5 Men in a row so that the women occupy the even places. How many such arrangements are possible?

Answer:

2880

Hint:

4 women can be arranged on 4 even places in $4!$ Ways.

Q8) There are 3 candidates for a classical, 5 for a mathematical, and 4 for natural science scholarship. In how many ways can these scholarships be awarded (one scholarship per subject)

- a) 60
- b) 30
- c) 15
- d) 20

Answer:

Classical scholarship can be awarded to any one of the 3 candidates.

Mathematical can be awarded to any one of the 5 candidates.

Natural science scholarship can be awarded to any one of the 4 candidates.

So, Number of ways of awarding three scholarships = $3 \times 5 \times 4 = 60$

Q9) A room has 6 doors. In how many ways can a person enter the room through one door and come out through a different

Answer:

30

Hint: A person can enter the room in 6 ways and can exit the room in 5 ways.

Q10) In how many ways can 3 prizes be distributed among 4 boys, when

- i) No boy gets more than one prize?
- ii) A boy may get any number of prizes?
- iii) No boy gets all the prizes?

Answer:

- i) 24
- ii) 64
- iii) 60

Explanation:

i) The prize can be taken by 4 boys; second prize can be taken by 3 boys and third prize can be taken by 2 boys.

Hence total number of ways are $4 \times 3 \times 2 = 24$

OR

$${}^4P_3 = \frac{4!}{1!} = 24$$

ii) First prize to any one of the 4 boys, Second to any one of the 4 boys, and third to any one of the 4 boys.

Hence total number of ways are $4 \times 4 \times 4 = 64$

iii) Since any one of the 4 boys may get all the prizes. So, the number of ways in which a boy gets all the 3 prizes = 4

So the number of ways in which a boy does not get all the prizes = $4^3 - 4 = 60$