Name: VEN THON
ID: e20191250
Group: I3-GIC-C

1. How many permutation of a set of 6 numbers {1,3,5,8,9,7} ?

In this case, we permutate 6 numbers among 6 numbers.

⇨ P(n) = n!

P(6) = 6! = 720 permutations

2. How many possible ways to arrange 4 letters among 7 letters {A,E,I,O,U,D,N} ?

In this case, we arrange 4 letters among 7 letters.

⇨ $A^{P}_{n} = \frac{n!}{(n-p)!}$

⇨ $A^{4}_{7} = \frac{7!}{(7-4)!} = 840\ possible\ arrangements$

3. How many groups of 6 pets can be chosen from 10 pigs and 8 horses if:

a. exactly 4 pigs must be on each group

⇨ $C^{P}_{n} = \frac{n!}{p!(n-p)!}$

⇨ $C^{4}_{10} \times C^{2}_{8} = \frac{10!}{4!(10-4)!} \times \frac{8!}{2!(8-2)!} = 210 \times 28 = 5880$

b. at least 4 pigs must be on each group

⇨ $C^{4}_{10} \times C^{2}_{8} + C^{5}_{10} \times C^{1}_{8} + C^{6}_{10} \times C^{0}_{8}$

$= \frac{10!}{4!(10-4)!} \times \frac{8!}{2!(8-2)!} + \frac{10!}{5!(10-5)!} \times \frac{8!}{1!(8-1)!} + \frac{10!}{6!(10-6)!} \times \frac{8!}{0!(8-0)!}$

$= 210 \times 28 + 252 \times 8 + 210 \times 1 = 8106$

c. exactly 5 horses must be on each group

⇨ $C^{5}_{8} \times C^{1}_{10} = \frac{8!}{5!(8-5)!} \times \frac{10!}{1!(10-1)!} = 56 \times 10 = 560$

d. at least 5 horses must be on each group

⇨ $C^{5}_{8} \times C^{1}_{10} + C^{6}_{8} \times C^{0}_{10}$

$= \frac{8!}{5!(8-5)!} \times \frac{10!}{1!(10-1)!} + \frac{8!}{6!(8-6)!} \times \frac{10!}{0!(10-0)!}$

$= 56 \times 10 + 28 \times 1 = 588$