TUTORIAL6: COUNTING TECHNIQUES

Permutation (order)

1. Find the number of permutation from 6 objects, a, b, c, d, e, f, without repetition.
2. Find the number of permutation from 6 objects, a, b, c, d, e, f, taken 4 at a time, without repetition.
3. Find the number of permutation from 6 objects, a, b, c, d, e, f, taken 3 at a time, without repetition.
4. Assume that the repetition is not allowed. How many orders that can be build from 6 numbers, 2, 3, 4, 5, 7 and 9, taken 3 at a time, to produce any number in hundreds,
    a) Without any condition
    b) Produce values less than 400.
    c) Produce the even values.
    d) Produce the odd values.
    e) Produce values that are the multiple of 5.
5. Repeat number 4 with repetition.
6. Find the number of ways so that 7 person can sit in 7 chairs in a row.
7. Find the number of ways a jury can determine 1st place, 2nd place and 3rd place from 18 contestants.
8. A box contains 10 lamps. Find the number of random sample if the lamps are retrieved one by one:
    a) 3 lamps without replacement b) 3 lamps with replacement
9. Solve number 6, with 4 lamps.
10. A debate team consist of 3 men and 2 women. Find the number of ways they can sit in a row:
    a) Without any restriction
    b) Men must sit next to men, and women must sit next to women.
    c) Women must sit next to women.
11. Solve number 8 with *r* men and *s* women.
12. A debate team consist of 6 men and 5 women. Find the number of ways they can sit in a row:
    a) Without any restriction
    b) Men must sit next to men, and women must sit next to women.
    c) Women must sit next to women.
    d) No men can sit next to other men.

13. Find the number of ways to store 4 mathematics books, 3 history book, 3 chemistry books, 2 biology books in a shelf so that the same subject must be put next to each other.
14. Find the number of permutation of the following:
    a) RADAR
    b) UNUSUAL
    c) BENZENE
    d) ELEVEN
15. Find the number of ways to make 4-letter words from the word NUMERICAL (It maybe has no meaning) if:
    a) No condition given.
    b) Must begin and ending with the consonants.
    c) Must contain the letter R.
    d) Must contain the letter M and must end with vocal (aeiou).
16. Find P(7, 3), P(12, 2), P(5, 7), P(8, 3), P(19, 1), P(6, -2).
17. P(n, 2) = 72, find n.
18. P(n, 4) = 42 P(n, 2), find n.

Combination (choose/select)

1. Find the number of selection if we choose 3 persons from 8 persons.
2. A farmer bought 3 cows, 2 goats and 4 chickens from a man who have 6 cows, 5 goats and 8 chickens. How many choices do the farmer has?
3. A class consist of 7 men and 5 women. Find the number of choices to choose a 5 committee members:
    a) Without condition
    b) Must have 3 men and 2 women
    c) Must have at least 1 men
    d) Must have at least 1 men and 1 women
4. A group consist of 6 men and 5 women. Find the number of choosing 5 committee members:
    e) Without condition
    f) Must have 2 men and 2 women and another person either men or women
    g) The number of men must exceed the number of women
    h) Must have at least 1 men and 1 women

5. A bag consists of 5 red marble and 6 white marble. Find the number of choosing 4 marble:
    a) Without condition
    b) With 2 red marble and 2 white marble
    c) With the same colours.
6. How many choices are there if we want to make a 5 person committee from 12 persons, if the president has already been chosen?
7. A student was given 15 questions in a test. Find the number of choices if:
    a) He must answer 10 questions only.
    b) He must answer 10 questions but the first 5 are compulsory.
    c) He must answer 10 questions, where the first 5 from Section A question 1 to 8, and another 5 from Section b, question 9 to 15.
    d) He must answer 10 questions, where at least 6 question from Section A question 1 to 8.

Pigeonhole

1. If 13 people in one room, show that at least 2 people born in the same month.

2. Show that if 7 numbers was chosen from 1 to 12, any 2 of it will add to 13.

3. How many friend you should have to ensure that at least 5 of them have the same birth month?

4. 6 persons collect their money and the amount is RM 21.61. Show that at least one of them must have RM 3.61.