COMBINATION

CANSU OLCE

A STAR MATHS (www.astarmaths.com.au)

1. How many ways can a man choose 3 different servings of food from pizza, spaghetti, grilled fish, grilled octopus, butter chicken, burger and laksa?

2. On a plane, there are 14 points in such a way that none of any three points can form a straight line. Calculate the number of triangles that can formed by taking any three points as their vertices.

3. There are 6 blue balls and 7 yellow balls. All the balls of the same colour are of different sizes. Calculate the number of combinations of a set of 2 blue balls and 3 yellow balls.

4. In an exam paper, Zara needs to answer 4 questions from section A which consists of 5 questions, 2 questions from section B which consists of 4 questions and 1 question from section C which consists of 2 questions. Calculate the number of different ways Zara can choose her questions.

5. Lara wants to invite 5 of her colleagues to dinner. She has 10 colleagues which includes a couple (husband and wife). Calculate the number of ways she can invite her colleagues if the couple must be invited.

6.   Mr. Brown wants to put 10 papayas into three baskets. He wants to put 5 papayas into the first basket, 3 papayas into the second basket and the rest into the third basket. All the papayas are of different sizes and shapes. Calculate the number of ways Mr. Brown can put the papayas into the three basket.

7.   9 points are marked on two vertical parallel lines. The first line has 2 points while the second line has 7 points. Calculate the number of triangles that can be formed by taking any three points from the 9 points as their vertices.

8.   If a student is allowed to choose any number of guidebooks (at least 1) from 4 guidebooks of different publishers, how many different choices can he make?

9.   A Science society committee which consists of 6 members are to be selected from 5 female members and 4 male members. Calculate the number of different committees that can be formed if
      (a) There is no restriction
      (b) The number of females must be more than the number of males.

10. A group of 6 dancers are to be chose from 7 Turkish, 5 English and 4 Greek students to perform a dance during a school cultural night. Calculate the number of different ways the group of dancers can be formed if
    a) there is no restriction
    b) the group of dancers must consist of equal number of Turkish, English and Greek students.

11. A mixed badminton team which consists of 5 players is to be formed from 4 male players 5 female players. Calculate the number of different teams that can be formed such that the number of male players must exceed the number of female players.

12. There are five tubes of watercolours consisting of the colours red, green, yellow, blue and white. Calculate the number of ways
    a) to arrange three tubes in a row from the five tubes of watercolours,
    b) the mixture of any two different colours can be done.

13. Six prefects are to be selected from a group of 20 students. Find the number selections that can be carried out.

14. A hotel guest is allowed to choose any 5 food items from a list of 12 food items in the menu for breakfast. Calculate the number of possible choices.

15. A student is allowed to pick any 4 days of a week for his sport training sessions. Calculate the number of different combinations of days he can pick.

16. A boy draws 3 numbers randomly from a set of prime numbers which are less than 20. Find the number of possible outcomes.

17. Four colors are to be selected from red, green, blue, yellow, white and black. If yellow color must be included in the selection, find the number of different selections that can be made.

18. A deejay selects 5 songs from among 2 Italian songs and 6 Spanish songs to be played. Find the number of different selections possible if 2 Italian songs must be included.

19. There are 8 books in box A and 5 books in box B. A student has to select 4 books from box A and 2 books from box B. Find the number of different selections he can have.

20. A team comprising 5 male players and 3 female players are to be selected from 10 male players and 8 female players. Find the number of different teams that can be formed.

21. Two badminton teams with 5 players each are to play doubles matches against each other. Find the number of different doubles matches that can be played.

22. A teacher wishes to select 5 books from 4 fiction and 3 non-fiction books.
    a) Find the number of ways the selection can be made.
    b) If 3 of the 5 books to be selected must be fiction, find the number of ways the selection can be made.

23. Five students are to be selected from a head prefect, an assistant head prefect and 8 ordinary prefects. Find the number of ways the selection can be made if
    a) both the head and assistant head prefects must be included in the selection.
    b) either the head prefect or the assistant head prefect is included in the selection.

24. A group of 7 workers is to be selected from 5 male workers and 9 female workers. Find the number of different selections that can be made if
    a) there is no restriction on the number of male or female workers to be selected.
    b) all male workers are to be selected.
    c) not more than 2 male workers are to be selected.

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25. A committee consisting of 6 members is to be chosen from the headmaster. 3 senior assistants, 5 teachers and 5 parents. Find the number of ways the committee can be formed if the committee must consist of

    a) the headmaster, a senior assistant, two teachers and two parents.

    b) either the headmaster or a senior assistant, two teachers and three parents.

26. A test paper consists of 4 questions in Section A and 3 questions in section B. Find the number of the ways the questions can be selected if the candidates

    a) are required to choose 3 questions from Section A and 2 questions from Section B.

    b) are allowed to choose any 5 of the questions from Section A and Section B.

27. A bag contains 5 cards, each written with a different vowel and 7 cards, each written with a different consonant. If 5 cards are drawn randomly from the bag, find the number of possible outcomes where

    a) either all the cards show vowels or all the cards show consonants.

    b) at least one card shows a vowel.

28. A teacher has to divide 15 students into groups. Find the number of ways he can form the groups if he divides the students into

    a) two groups, one with 7 students and another one with 8 students.

    b) Three groups, one with 3 students, one with 5 students and another one with 7 students.

ANSWER KEY

1. 35
2. 364
3. 525
4. 60
5. 56
6. 2520
7. 49
8. 15
9. a)84 b)34
10. a)8008 b)1260
11. 45
12. a)60 b)10
13. 38760
14. 792
15. 35
16. 56
17. 10
18. 20
19. 700
20. 14112
21. 100
22. a)21 b)12
23. a)56 b)140
24. a)3432 b)36 c)1716
25. a)300 b)400
26. a)12 b)21
27. a)22 b)771
28. a)6435 b)360360