

Is That an Order?

In the summer Olympics runners from eight different nations stand at the starting line of the 100 meter dash. In less than 11 seconds all the runners will have crossed the finish line. Does it matter, to the runners or their nations, what order they finish in?

Is That an Order?

A _____ is the number of ways items can be arranged when the order of the items is important.

Is That An Order?

- Mr. Capretto selected 16 of his 48 students to compete at the History Bowl. Does it matter which student he told first?

Is That an Order?

A _____ is the number of ways items can be chosen when the order of the items is not important.

Key Words

Permutation

Combination

Identify the Permutations and Combinations.

People are standing in a line.

Pick a group of songs.

Arrange the books on the shelf.

4 Gumdrops are selected at once from a bag of 30.

A committee of your peers will be selected to judge you.

Ways you can answer a multiple choice test.

A president and vice-president will be selected from each homeroom.

A race is run.

5-digit numbers are formed from {1,2,5,7,9}

1. How many ways can you arrange the letters of the word FACTOR?
2. How many ways can you choose two jellybeans from a bag of 15?
3. How many ways can five different textbooks be arranged on a shelf?
4. How many groups of 3 toys can a child choose to take on a vacation from a toy box containing 11 toys?
5. How many different sets of 6 questions for a test can be chosen from a file containing 22 questions?
6. How many ways can Laura color a map with 4 adjacent regions if she has 15 colored pencils?
7. How many ways can a teacher select 5 students from a class of 23 students to create a bulletin board display?

8) A test is administered with 15 questions. Students are allowed to answer any ten. How many choices of ten questions are there?

- A.) 150 B.) 250 C.) 3003 D.) 3000

9.) In a contest in which there are 8 participants, in how many ways can 5 distinct prizes be awarded?

- A.) 112 B.) 6720 C.) 336 D.) 672

10.) From a group of 8 people, 5 will each win \$1,000. How many different winning groups are possible?

- A.) 56 B.) 6720 C.) 168 D.) 336

11) A club elects a president, vice-president, and secretary-treasurer. How many sets of officers are possible if there are 15 members and any member can be elected to each position? No person can hold more than one position.

- A.) 2730 B.) 32,760 C.) 910 D.) 1365

12.) A church has 7 bells in its bell tower. Before each church service 5 bells are rung in sequence. No bell is rung more than once. How many possible sequences are there?

- A.) 2520 B.) 42 C.) 84 D.) 21

13.) How many arrangements can be made using 2 letters of the word HYPERBOLAS if no letter is to be used more than once?

- A.) 1,814,400 B.) 3,628,800
C.) 45 D.) 90

14.) A work softball team has 15 players on its roster. There are 9 distinct positions in which

these players can be placed. How many lineups can be fielded?

- A.) 1,505,667,870 B.) 1,635,890
C.) 1,816,214,400 D.) 214,400

15.) From a group of 8 people, 5 will each win \$1,000. How many different winning groups are possible?

- A.) 56 B.) 6720 C.) 168 D.) 336

16.) Of a classroom filled with 20 students, 2 will be selected to stay after school and correct homework for extra credit. How many ways are possible?

- A.) 190 B.) 210 C.) 63 D.) 40

17.) To win the lottery, one must correctly select 6 numbers from a collection of 50 numbers (one through 50). The order in which the selection is made does not matter. How many different selections are possible?

- A.) 250 B.) 15,890,700
C.) 300 D.) 13,983,816

Name: _____ JMJ Combination vs. Permutation Worksheet

1. In a race in which six automobiles are entered and there are not ties, in how many ways can the first four finishers come in?
2. The model of the car you are thinking of buying is available in nine different colors and three different styles (hatchback, sedan, or station wagon). In how many ways can you order the car?
3. A book club offers a choice of 8 books from a list of 40. In how many ways can a member make a collection?
4. A medical researcher needs 6 people to test the effectiveness of an experimental drug. If 13 people have volunteered for the test, in how many ways can 6 people be selected?
5. From a club of 20 people, in how many ways can a group of three members be selected?
6. From the 30 pictures I have of my daughter's first birthday, my digital picture frame will only hold 3 at a time.
 - a. How many different groups of 3 pictures can I put on the frame?
 - b. What if I just wanted to fill the first three places with my favorite, best smile and best smashing of the cake?
7. A popular brand of pen is available in three colors (red, green or blue) and four tips (bold, medium, fine or micro). How many different choices of pens do you have with this brand?
8. A corporation has ten members on its board of directors. In how many ways can it elect a president, vice-president, secretary and treasurer?
9. For a segment of a radio show, a disc jockey can play 7 songs. If there are 12 songs to select from, in how many ways can the program for this segment be arranged?
10. How many different ways can a director select 4 actors from a group of 20 actors to attend a workshop on performing in rock musicals?
11. What if the director in #10 wanted to fill positions of lead, supporting actor, extra 1 and extra 2?
12. From the 20 CD's you bought this past year, you plan to take 3 with you on vacation. How many different sets of three CD's can you take?
13. Suppose you find 7 articles related to the topic of your research paper. In how many ways can you choose 5 articles to read?
14. You want to get a cell phone and you must decide on the right plan. If there are 10 different phones, 6 different calling plans and 3 different texting plans, how many different plans could you pick from if you can choose one phone, one calling plan and one texting plan?