

And we know that the Son of God has come and has given us an understanding, that we may know Him who is true; and we are in Him who is true, in **His Son Jesus Christ**. **This is the true God** and eternal life. 1 John 5:20

The counting Principle

Term	Definition	Notations	Formula	Example
Combination	A combination is a selection of objects from a larger set where the order in which the objects are chosen does not matter.	${}_n C_r$ ${}_n C_r$ C_r^n $C(n,r)$	$C_r^n = \frac{n!}{r!(n-r)!}$ n: the total number of items in the set. r: the number of items wants to choose from the set.	Consider a set of four letters: A, B, C, and D. How many unique combinations of three letters you can create from this set? Use the formula for combinations $C_r^n = \frac{n!}{r!(n-r)!}$ Plugging in the values for our example, we get: $C(4,3) = \frac{4!}{3!(4-3)!} = \frac{4!}{3!1!} = \frac{4 \cdot 3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1 \cdot 1} = 4$ So, there are four unique combinations of three letters that you can create from the set: ABC, ABD, ACD, and BCD
Permutation	A permutation is an arrangement of a set of distinct objects in a specific order. The order in which you arrange the items does matters.	${}_n P_r$ ${}_n P_r$ P_r^n $P(n,r)$	$P_r^n = \frac{n!}{(n-r)!}$ n: the total number of items in the set. r: the number of items wants to arrange from the set.	Consider a set of four letters: A, B, C, and D. How many unique arrangements of two letters you can create from this set? Use the formula for permutations $P_r^n = \frac{n!}{(n-r)!}$ Plugging in the values in formula, we get: $P_2^4 = \frac{4!}{(4-2)!} = \frac{4!}{2!} = \frac{4 \cdot 3 \cdot 2 \cdot 1}{2 \cdot 1} = 12$ So, there are twelve unique arrangements of two letters that you can create from the set: AB, AC, AD, BA, BC, BD, CA, CB, CD, DA, DB, and DC.

Here is a summary of Combinations and Permutations, you probably do not get too many questions about it on the test (GED ACT or SAT) but just in case I gave you the formula and examples of how to do it and interpret this kind of problem.

Remember to Calculate Combinations and Permutation you need to understand factorial and how to do operations with factorial. Here is another summary.

$0! = 1$
$1! = 1$
$2! = 2 * 1 = 2$
$3! = 3 * 2 * 1 = 6$
$4! = 4 * 3 * 2 * 1 = 24$
$5! = 5 * 4 * 3 * 2 * 1 = 120$

Factorial of a whole number “n” is defined of the product of all whole numbers less than or equal to “n” until 1.

He who believes in the Son has everlasting life; and he who does not believe the Son shall not see life, but the wrath of God abides on him.” John 3:36