Katniss, Rue, Peeta, Thresh, Foxface, Cato, Clove, Glimmer, Marvel

Total number of people	People picked to put in order	Written mathematically $_nP_r$	Number of ways to order them	How to solve mathematically
1	1			
2	1			
2	2			
3	1			
3	2			
3	3			
4	1			
4	2			
4	3			
4	4			
5	1			
5	2			
5	3			
5	4			
5	5			

1.	Say that we had 10 people to pick from in the front of the room. How many people would we select to give us the least number of permutations?	
2.	Say that we had 10 people to pick from in the front of the room. How many people would we select to give us the most number of permutations?	

An arrangement or listing in which order is important is called a **permutation**.

Example: Prizes – 3rd place: a Gale doll, 2nd place: a Rue doll, and 1st place: a Katniss doll. There are 7 different students from which Mr. Mangham will draw. How many possible ways can Mr. Mangham pick the winners for each prize?

 Using the Counting Principle, there are $7 \bullet 6 \bullet 5 = 210$ possible ways.

 $_7P_3$ represents the number of permutations of 7 students taken 3 at a time.
 $_7P_3 = 7 \bullet 6 \bullet 5 = 210$

 $_nP_r = n \bullet (n-1) \bullet (n-2) \bullet ... \bullet (n-r+1)$

$_4P_4$ would be calculated by: $_4P_4 = 4 \bullet 3 \bullet 2 \bullet 1 = 24$. The mathematical notation 4! is read "four **factorial**". n! means the product of all counting numbers beginning with n and counting backward to 1. 0! is defined as 1.

Find each value.

1.	$_6P_2$		2.	$_8P_3$		3.	4!	
4.	8!		5.	0!		6.	$_7P_4$	
7.	$_4P_2$		8.	$\dfrac{6!3!}{4!2!}$		9.	$\dfrac{8!4!}{5!2!}$	
10.	$_3P_2$		11.	$_9P_9$		12.	9!	

How many different ways can the letters of each word be arranged? Write both the factorial and the answer.

13.	RUE		14.	FLICKERMAN	
15.	CLOVE		16.	MARVEL	

17.	How many odd four-digit numbers can be formed from the digits 1, 2, 3, and 4? Write the possible odd numbers.	
18.	How many even four-digit numbers can be formed from the digits 1, 2, 3, and 5? Write the possible even numbers.	
19.	With the digits 1, 2, 3, 4, and 5, how many five-digit positive integers can be formed if no digits can be repeated	
20.	In how many different ways can you arrange the letters in the word JOURNALISM if you take six at a time?	Permutation Answer
21.	Write your own interesting word problem which can be solved by a permutation.	