



Math Virtual Learning

# Algebra IIB

May 20, 2020



Algebra IIB  
Lesson: May 20, 2020

**Objective/Learning Target:**  
Students will be able to distinguish between  
combination and permutation situations.

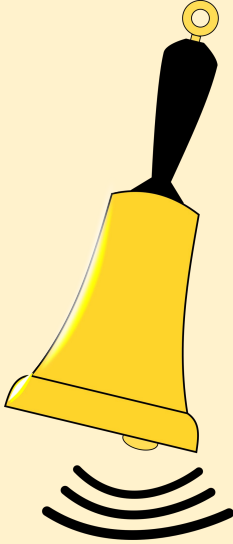
# Let's Get Started!

1. Can you evaluate this combination?

$${}_{22}C_{20}$$

2. Can you evaluate this permutation?

$${}_6P_2$$



# Let's Get Started! **Answers**

1. Can you evaluate this combination?

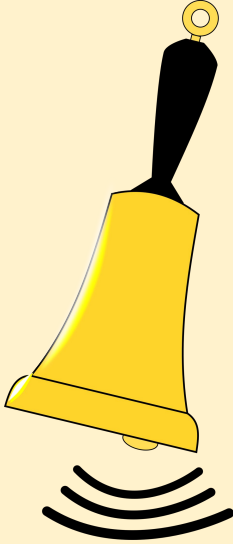
$${}_{22}C_{20}$$

231

2. Can you evaluate this permutation?

$${}_6P_2$$

30



# Recap

In the last two lessons we've worked with combinations and permutations separately, now we will do a review of the two with

Today we are going to do a quick review on the highlights of each one and some mixed practice.

# Combinations

- Total number of possibilities from having to make a SERIES of choices from ONE category
- The order of the selection is not important - just the final group of selections

- We used the formula

$$C(n, r) = \frac{n!}{r!(n - r)!}$$

- Example: There are 8 different marbles all of different colors in a bag. If you draw four of them, how many different ways can your pile of colors look?

$C(8, 4) = 70$  different combinations of marbles

# Permutations

- Total number of possibilities from having to make a SERIES of choices from ONE category
- The order of the selection is important - switching the order of the selections will be important
- We used the formula 
$$P(n, r) = \frac{n!}{(n - r)!}$$
- Example: There are 8 raffle tickets a bag. You are going to draw three of them as winners. Each winner gets a different prize. How many ways can the 8 raffle tickets win?

$P(8, 3) = 336$  different winning combinations

# You Try: Mixed Practice #1

1. In a contest, 4 winners will get equal prizes. If 20 people enter the contest, how many different groups of 4 winners can be chosen?
2. 30 Artists enter an Art Show Contest. How many ways can you award 1st, 2nd, 3rd, and Honorable Mention ribbons?
3. The ACT Prep kids in Mrs. Hendrick's room always stack their ACT books on a shelf when they leave each day. There are 8 kids in the class. How many different ways can the books be stacked on her shelf?
4. There are 8 different marbles all of different colors in a bag. If you draw four of them, how many different ways can your pile of colors look?
5. Social Security numbers have 9 digits. Assume that digits are not repeated (which is not true), how many SSNs can be created?



# You Try: Mixed Practice #1 ANSWERS

1. In a contest, 4 winners will get equal prizes. If 20 people enter the contest, how many different groups of 4 winners can be chosen? **COMBINATION because order doesn't matter if they are equal prizes.  $C(20,4) = 4845$**
2. 30 Artists enter an Art Show Contest. How many ways can you award 1st, 2nd, 3rd, and Honorable Mention ribbons? **PERMUTATION (order matters)  $P(30,4) = 657,720$**
3. The ACT Prep kids in Mrs. Hendrick's room always stack their ACT books on a shelf when they leave each day. There are 8 kids in the class. How many different ways can the books be stacked on her shelf? **PERMUTATION (order matters because if Susie put her book in the 1st spot she cannot put it in another spot) but we need to use all 8 of the books.  $P(8,8)$  or  $8! = 40,320$**
4. There are 8 different marbles all of different colors in a bag. If you draw four of them, how many different ways can your pile of colors look?  
**This is a COMBINATION because the order the marbles are drawn in is NOT important. The question was about the final group of marbles.**
5. Social Security numbers have 9 digits. How many unique SSNs can be created?  
**This is a permutation because the order will matter. A SSN of 123456789 is different than an SSN of 987654321.**