LESSON MAKER PRO

Order Changes Everything

Choose a group or fill distinct roles.

HIGH SCHOOL · FM.AC.A.8.a

FM.AC.A.8.a "Identify differences between applications of combinations and permutations."

NAME _____ DATE _____

DOES ORDER MATTER?

If switching two choices creates a new outcome, multiply the choices for each position. If the switched choices make the same group, divide that product by the number of ways to arrange the group.

WORKED EXAMPLE

Assign a speaker, editor, and host from 5 students. Each student can fill only one role. How many assignments are possible?

CHOICES FOR EACH ROLE

Speaker	Editor	Host
5	4	3

1. The roles differ, so switching students creates a new assignment.
2. Multiply the choices: 5 × 4 × 3 = 60.

Answer: 60 assignments

PRACTICE 4 problems

1 Choose 2 of 6 songs for a playlist. Their order does not matter. How many pairs are possible?

ANSWER _____

2 Award first and second place to 2 of 7 finalists. How many results are possible?

ANSWER _____

3 Choose 3 of 8 students for a team with no assigned roles. How many teams are possible?

ANSWER _____

4 Assign a lead singer and a drummer from 9 musicians. How many assignments are possible?

ANSWER _____

APPLY IT Show your work

1 A gaming club chooses 4 of 10 games for an event. It has not set the playing order. Is this a combination or permutation? How many sets can it choose?

WORK SPACE

ANSWER _____

2 A festival books 4 of 6 bands for four different time slots. Is this a combination or permutation? How many schedules are possible?

WORK SPACE

ANSWER _____

CHALLENGE One step up

From 11 applicants, how many 3-person teams can you choose? How many ways can you assign a captain, reporter, and planner from the same applicants? Explain why the counts differ.

WORK SPACE AND ANSWER

ANSWER KEY

Order Changes Everything

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Choose 2 of 6 songs for a playlist. Their order does not matter. How many pairs are possible?	**15 pairs**
2	Award first and second place to 2 of 7 finalists. How many results are possible?	**42 results**
3	Choose 3 of 8 students for a team with no assigned roles. How many teams are possible?	**56 teams**
4	Assign a lead singer and a drummer from 9 musicians. How many assignments are possible?	**72 assignments**

PART 2 · APPLY IT

1. **Combination; 210 sets** Order does not matter. Calculate $(10 \times 9 \times 8 \times 7)/(4 \times 3 \times 2 \times 1) = 210$.
2. **Permutation; 360 schedules** Time slots differ, so order matters. Calculate $6 \times 5 \times 4 \times 3 = 360$.

CHALLENGE

165 teams; 990 role assignments. Each team of 3 has 6 different ways to assign the roles, so $165 \times 6 = 990$.

Accept equivalent counting expressions. In the challenge, the explanation should distinguish an unordered team from three distinct roles.