

4.5 & 4.6 Combinations p. 270, 273

Name _____

Date _____

Goal: Explore how counting combinations differs from counting permutations.**INVESTIGATE** the Math

1. If 5 sprinters compete in a race, how many different ways can the medals for first, second and third place, be awarded?

Does order matter here?

This is an example of a permutation of _____ objects, taken _____ at a time.

2. If 5 sprinters complete in a race and the fastest 3 qualify for the relay team, how many different relay teams can be formed?

Visualize the 5 sprinters below. Since 3 will qualify for the relay team and 2 will not, consider the number of ways of arranging 3 Y's and 2 N's.

Does order matter here?

This is an example of a combination of _____ objects, taken _____ at a time.

- c. How many different committees of 3 people can be formed with 1 male and 2 females?

Think: you must choose 1 male out of the group of 3 males and 2 females out of the group of 4 females

- d. How many different committees of 3 people can be formed with at least one male on the committee?

Notes:

- The formula for ${}_nC_r$ is the formula for ${}_nP_r$ divided by _____. Dividing by _____ eliminates the counting of the same combination of r objects arranged _____
- When solving problems involving combinations, it may also be necessary to use the _____
- Sometimes combination problems can be solved using direct reasoning. This occurs when there are conditions involved. To do this, follow the steps below:
 1. Consider only the cases that reflect the _____
 2. Determine the _____ of combinations for each case.
 3. _____ the results of step 2 to determine the total number of combinations.
- Sometimes combination problems that have conditions can be solved using indirect reasoning. To do this, follow these steps:
 1. Determine the _____ of combinations without any conditions.
 2. Consider only the cases that _____ meet the conditions.
 3. Determine the number of combinations for each case identified in step 2.
 4. _____ the results of step 3 from step 1.