

# Permutations and Combinations

10th Grade

Does the order matter? That one question chooses the formula.

## PERMUTATION

- Order matters
- Arrangements, rankings, passwords
- $nPr = n! / (n-r)!$
- 1st, 2nd and 3rd place
- Always larger than the combination

## COMBINATION

- Order does not matter
- Committees, hands of cards, teams
- $nCr = n! / (r!(n-r)!)$
- Choosing 3 people for a group
- Always smaller

### THE DIFFERENCE THAT MATTERS

Picking gold, silver and bronze is a permutation. Picking three finalists is a combination.

$nCr$  is  $nPr$  divided by  $r!$ , because  $r!$  orderings of the same group all count as one.