

13.3 Find Permutations and Combinations



QUESTION How can you find combinations and permutations using a graphing calculator?

EXAMPLE 1 Find the number of combinations

STARTERS There are 15 players on your softball team, but only 9 of them can be the starting players in one game. How many combinations of starting players are possible?

Solution

You are finding ${}_n C_r$ where $n = 15$ and $r = 9$. Enter 15 for n . Press **MATH**. Go to the PRB menu and select ${}_n C_r$. Then enter 9 for r .

▶ There are 5005 possible combinations of starting players.



EXAMPLE 2 Find the number of permutations

BATTING ORDER Before each softball game, your coach announces the batting order of the 9 starting players. This is the order in which the starting players will bat. How many batting orders can be formed using 9 players on your team of 15 players?

Solution

You are finding ${}_n P_r$ where $n = 15$ and $r = 9$. Enter 15 for n . Press **MATH**. Go to the PRB menu and select ${}_n P_r$. Then enter 9 for r .

▶ There are 1,816,214,400 possible batting orders.



PRACTICE

Evaluate the expression.

- 1. ${}_7 C_4$
- 2. ${}_6 C_6$
- 3. ${}_{10} C_3$
- 4. ${}_{16} C_8$
- 5. ${}_9 P_5$
- 6. ${}_7 P_6$
- 7. ${}_{11} P_8$
- 8. ${}_{12} P_5$

9. **GROUP PROJECT** Your teacher selects 3 students from a class of 28 students to work on a project in a group. Within the group, one member must be the writer, one must be the researcher, and one must be the presenter.
- a. How many different groups of 3 can your teacher select?
 - b. After the group is formed, in how many ways can the roles in the group be assigned?