LESSON MAKER PRO

Choose Your Crew

Count groups when order does not matter.

HIGH SCHOOL · FM.AC.A.8.c

FM.AC.A.8.c "Using application-based problems, calculate the number of subsets of size r that can be chosen from a set of n elements, explaining this number as the number of combinations "n choose r.""

NAME _____ DATE _____

COUNTING COMBINATIONS

When you choose r items from n distinct items and order does not matter, the number of groups is called "n choose r," written C(n, r). To calculate it, multiply r descending numbers starting at n, then divide by r!, where r! is the product of the whole numbers from r down to 1.

WORKED EXAMPLE

A club has 11 poster designs and will display 3 of them. How many different sets of designs can it display?

1. Order does not matter, so calculate C(11, 3).
2. Multiply 3 descending numbers starting at 11: 11 × 10 × 9.
3. Divide by 3! = 3 × 2 × 1: (11 × 10 × 9)/(3 × 2 × 1) = 165.

Answer: 165 sets

PRACTICE 6 problems

1 You have 5 video clips and choose 2 to share. How many different pairs can you choose?

ANSWER _____

2 A game offers 6 maps. Your group chooses 2 maps to try, with no preference for which comes first. How many pairs are possible?

ANSWER _____

3 A food truck offers 7 sauces. You choose 4 different sauces for a taste test. How many sets can you choose?

ANSWER _____

4 A club has 8 members willing to speak at an event. How many pairs of speakers can the club choose?

ANSWER _____

5 You have 10 songs and download 5 for offline listening. How many sets of songs can you download?

ANSWER _____

6 A library displays 12 graphic novels. You choose 6 to borrow. How many different sets can you choose?

ANSWER _____

APPLY IT Show your work

1 An esports club has 14 players available for a scrimmage. It needs a team of 4, and every player has the same role. How many different teams can the club make?

WORK SPACE

ANSWER _____

2 You find 16 summer programs that fit your schedule. You can apply to 2 of them. How many different pairs of programs could you apply to?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A team of 5 must be chosen from 9 players. The captain must be on the team. How many different teams are possible? Explain how you counted.

WORK SPACE AND ANSWER

ANSWER KEY

Choose Your Crew

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	You have 5 video clips and choose 2 to share. How many different pairs can you choose?	**10 pairs**
2	A game offers 6 maps. Your group chooses 2 maps to try, with no preference for which comes first. How many pairs are possible?	**15 pairs**
3	A food truck offers 7 sauces. You choose 4 different sauces for a taste test. How many sets can you choose?	**35 sets**
4	A club has 8 members willing to speak at an event. How many pairs of speakers can the club choose?	**28 pairs**
5	You have 10 songs and download 5 for offline listening. How many sets of songs can you download?	**252 sets**
6	A library displays 12 graphic novels. You choose 6 to borrow. How many different sets can you choose?	**924 sets**

PART 2 · APPLY IT

1. **1,001 teams** Order does not matter, so calculate C(14, 4) = (14 × 13 × 12 × 11)/(4 × 3 × 2 × 1) = 1,001.
2. **120 pairs** Calculate C(16, 2) = (16 × 15)/(2 × 1) = 120.

CHALLENGE

70 teams. The captain is already on the team, so choose the other 4 players from the remaining 8: C(8, 4) = 70.

Accept equivalent combination calculations that give the stated totals. For the challenge, the explanation must account for the captain being included.