

S.CP.B.9: Combinations 1b

- 1 The expression ${}_9C_2$ is equivalent to
1) ${}_9P_2$ 2) ${}_9P_7$ 3) ${}_9C_7$ 4) $\frac{9!}{2!}$
- 2 The expression ${}_8C_3$ is equivalent to
1) ${}_8C_5$ 2) $\frac{8!}{3!}$ 3) ${}_8P_3$ 4) ${}_8P_5$
- 3 How many different three-member teams can be formed from six students?
- 4 If there are four teams in a league, how many games will have to be played so that each team plays every other team once?
- 5 How many different ways can teams of four members be formed from a class of 20 students?
- 6 How many different five-member teams can be made from a group of eight students, if each student has an equal chance of being chosen?
- 7 How many different three-member teams can be selected from a group of seven students?
- 8 In the next Olympics, the United States can enter four athletes in the diving competition. How many different teams of four divers can be selected from a group of nine divers?
- 9 If the Math Olympiad Club consists of eighteen students, how many different teams of four students can be formed for competitions?
- 10 Five people have volunteered to work on an awards dinner at Madison High School. How many different committees of four can be formed from the five people?
- 11 A customer will select three different toppings for a supreme pizza. If there are nine different toppings to choose from, how many different supreme pizzas can be made?
- 12 The principal would like to assemble a committee of 8 students from the 15-member student council. How many different committees can be chosen?
- 13 Ms. Bell's mathematics class consists of 4 sophomores, 10 juniors, and 5 seniors. How many different ways can Ms. Bell create a four-member committee of juniors if each junior has an equal chance of being selected?

- 14 A school math team consists of three juniors and five seniors. How many different groups can be formed that consist of one junior and two seniors?
- 15 If order does *not* matter, which selection of students would produce the most possible committees?
- 16 Alan, Becky, Jesus, and Mariah are four students in the chess club. If two of these students will be selected to represent the school at a national convention, how many combinations of two students are possible?
- 17 An algebra class of 21 students must send 5 students to meet with the principal. How many different groups of 5 students could be formed from this class?
- 18 A blood bank needs twenty people to help with a blood drive. Twenty-five people have volunteered. Find how many different groups of twenty can be formed from the twenty-five volunteers.
- 19 Five friends met for lunch, and they all shook hands. Each person shook the other person's right hand only once. What was the total number of handshakes?
- 20 Megan decides to go out to eat. The menu at the restaurant has four appetizers, three soups, seven entrees, and five desserts. If Megan decides to order an appetizer *or* a soup, and one entree, and two different desserts, how many different choices can she make?
- 21 On a bookshelf, there are five different mystery books and six different biographies. How many different sets of four books can Emilio choose if two of the books must be mystery books and two of the books must be biographies?
- 22 A committee of 5 members is to be randomly selected from a group of 9 teachers and 20 students. Determine how many different committees can be formed if 2 members must be teachers and 3 members must be students.

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Answer Section

1 ANS: 3

$${}_n C_r = {}_n C_{n-r}$$

REF: 080527a

2 ANS: 1

$${}_n C_r = {}_n C_{n-r}$$

REF: 080720a

3 ANS:

20

$${}_6 C_3 = \frac{{}_6 P_3}{3!} = 20$$

REF: 069907a

4 ANS:

6

$${}_4 C_2 = \frac{{}_4 P_2}{2!} = 6$$

REF: 060114a

5 ANS:

4,845

$${}_{20} C_4 = 4,845$$

REF: 011509a2

6 ANS:

56

$${}_8 C_5 = \frac{{}_8 P_5}{5!} = 56$$

REF: 060320a

7 ANS:

35

$${}_7 C_3 = \frac{{}_7 P_3}{3!} = 35$$

REF: 010515a

8 ANS:

126

$${}_9 C_4 = \frac{{}_9 P_4}{4!} = 126$$

REF: 080626a

9 ANS:
3,060

$${}_{18}C_4 = \frac{{}_{18}P_4}{4!} = 3,060$$

REF: 010729a

10 ANS:
5

$${}_5C_4 = \frac{{}_5P_4}{4!} = 5$$

REF: 010424a

11 ANS:
84
 ${}_9C_3 = 84$

REF: 081513a2

12 ANS:
6,435
 ${}_{15}C_8 = 6,435$

REF: 081012a2

13 ANS:
210
 ${}_{10}C_4 = 210$

REF: 061113a2

14 ANS:
30
 ${}_3C_1 \cdot {}_5C_2 = 3 \cdot 10 = 30$

REF: 061422a2

15 ANS:
15 out of 25
 ${}_{15}C_5 = 3,003$. ${}_{25}C_5 = {}_{25}C_{20} = 53,130$. ${}_{25}C_{15} = 3,268,760$.

REF: 061227a2

16 ANS:
6. ${}_4C_2 = \frac{{}_4P_2}{2!} = 6$

REF: 080025a

17 ANS:

$$20,349. \quad {}_{21}C_5 = \frac{{}_{21}P_5}{5!} = 20,349$$

REF: 060534a

18 ANS:

$${}_{25}C_{20} = 53,130$$

REF: 011232a2

19 ANS:

$$10. \quad {}_5C_2 = \frac{{}_5P_2}{2!} = 10$$

REF: 060632a

20 ANS:

$$490. \quad (4 + 3) \times 7 \times \frac{5 \times 4}{2} = 490$$

REF: 080126a

21 ANS:

$$150. \quad {}_5C_2 \cdot {}_6C_2 = \frac{{}_5P_2}{2!} \cdot \frac{{}_6P_2}{2!} = 10 \cdot 15 = 150$$

REF: 080229a

22 ANS:

${}_9nC_2 \cdot 2 \cdot {}_{20}nC_3$ $= 41040$
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41,040.

REF: fall0935a2