

I. Evaluate each expression using both its “formula” and “calculator steps”. Show work!!

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|-----------------------------|---------------------------------|---------------|------------------|
| 1.) $P(8, 6)$ | 2.) ${}_9P_7$ | 3.) $C(5, 3)$ | 4.) ${}_2C_2$ |
| 5.) $C(4, 1)$ | 6.) ${}_4P_3$ | 7.) $P(8, 4)$ | 8.) ${}_{10}C_3$ |
| 9.) $C(9, 3) \cdot C(6, 2)$ | 10.) ${}_{12}C_4 \cdot {}_8C_3$ | | |

II. Determine whether each situation involves a permutation or a combination.

Then find the number of possibilities. Use the “calculator steps” for your work!

- 11.) seating 8 students in 8 seats in the front row of the school auditorium
- 12.) checking out 3 library books from a list of 8 books for a research paper
- 13.) choosing 2 movies to rent from 5 movies
- 14.) the first, second, and third-place finishers in a race with 10 contestants
- 15.) electing 4 candidates to a municipal planning board from a field of 7 candidates
- 16.) choosing 2 vegetables from a menu that offers 6 vegetable choices
- 17.) an arrangement of the letters in the word RHOMBUS
- 18.) selecting 2 of 8 choices of orange juice at a store
- 19.) placing a red rose bush, a yellow rose bush, a white rose bush, and a pink rose bush in a row in a planter
- 20.) selecting 2 of 9 kitten at an animal rescue shelter
- 21.) an arrangement of the letters in the word ISOSCELES
- 22.) selecting a 4-person bobsled team from a group of 9 athletes
- 23.) an arrangement of the letters in the word CANADA
- 24.) arranging 4 charm on a bracelet that has a clasp, a front, and a back
- 25.) selecting 3 desserts from 10 desserts that are displayed on a dessert cart in a restaurant
- 26.) an arrangement of the letters in the word ANNUALLY
- 27.) seating 5 men and 5 women alternately in a row, beginning with a woman
- 28.) Farmington High is planning its academic festival. All math classes will send 2 representatives to compete in the math bowl. How many different groups of students can be chosen from a class of 16 students?
- 29.) In a multi-lottery, the player must guess which five of forty-nine white balls will be drawn. The order in which the balls are drawn does not matter. The player must also guess which one of the forty-two red balls will be drawn. How many ways can the player fill out a lottery ticket?
- 30.) A photographer is taking pictures of a bride and groom and their 6 attendants. If she takes photographs of 3 people in a group, how may different groups can she photograph?
- 31.) An airline is hiring 5 flight attendants. If 8 people apply for the job, how many different groups of 5 attendants can the airline hire?
- 32.) There are 8 swimmers in a competition where the top 3 swimmers advance. In how many ways can 3 swimmers advance?